GAS

ENGINEERING • UTILIZATION • LOAD-BUILDING • MANAGEMENT

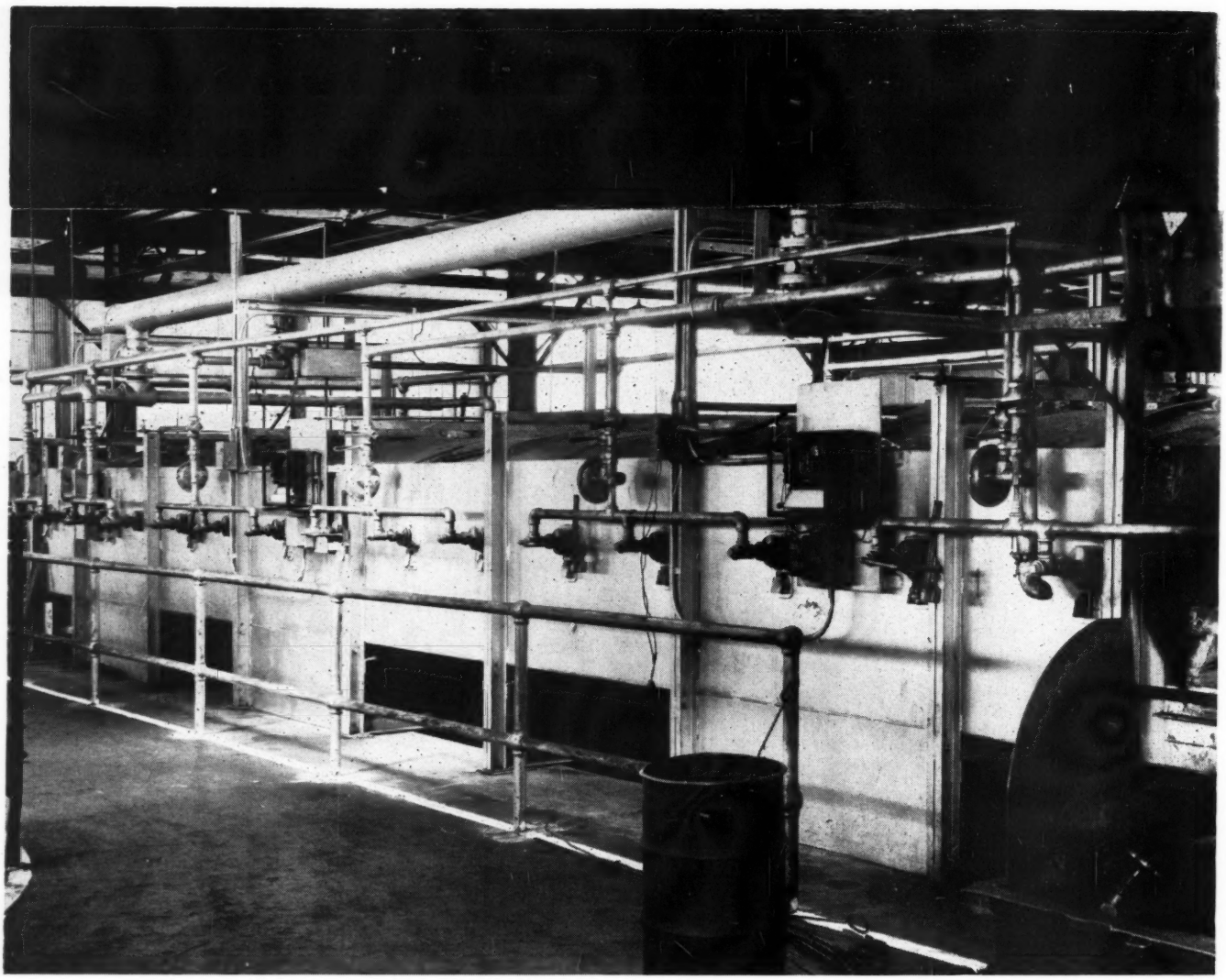
FEB 2 5 1946

REYNOLDS

ST ENGINEERING

. . . RECOGNIZED GAS CONTROL SINCE 1892 . . .

REYNOLDS GAS REGULATOR COMPANY Anderson Ind., U.S.A.



● Wherever gas is used in the metal industry, you will find Reliance Regulators on the job. The science of heat treating of metals today looms ever larger in the considerations of manufacturers. By the use of such closely controlled normalizing furnaces as that shown in the accompanying illustration, positive control of temperature is an absolute necessity.

For over 34 years Reliance Engineers have worked with industry to perfect the flawless, trouble-free performance built in every Reliance Regulator – performance you can depend on regardless of requirements.

Reliance Regulators are made in types and sizes most needed by the gas industry – production, distribution, industrial, domestic – for natural, manufactured and liquid petroleum gases.

Reliance bulletins give complete information. Write TODAY for your copy.

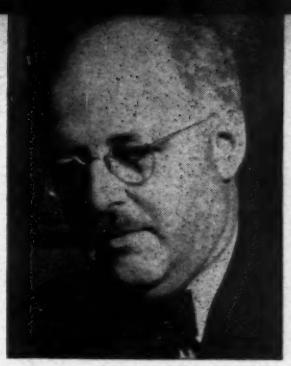
AMERICAN METERS RELIANCE

AMERICAN METER CO EST 1836

RELIANCE REGULATORS

THERMALLY THINKING

By ELLIOT TAYLOR, Editorial Director



Counsel of Confusion

IT is indeed fortunate that the farcical proceedings which the Federal Power Commission has felt obliged to dignify as hearings, under its Docket G-580 investigation of the natural gas industry, are now drawing to a close. Despite repeated statements by the commission that the hearings were to be non-adversary in nature—that they were designed only to elicite facts about the industry for the future guidance of the Commission, the whole trend and tenor of events has been set not by the Federal Power Commission—but by the noisy and antagonistic hirelings of the natural gas obstructionists.

The low state of buffonery toward which the hearings are rapidly cascading has nowhere been better illustrated than in the irrelevant questioning, the badgering of witnesses and the general display of plain bad manners that have marked the course of the meetings just concluded in Houston.

There, officials of the sovereign State of Texas, its Governor, members of its justly famous Railroad Commission and competent experts from the oil and gas industries appeared, voluntarily, to give the Federal Power Commission the benefit of their views, their experience and their intimate knowledge of all the intricacies of oil and gas matters as related to their own state.

These witnesses did not come reluctantly, nor were they in court under subpoena or summons. Their very appearance before the Commission should have implied a full faith and acceptance of their competence and attested to the sincerity of their motives. The dignity and respect due them, not only as officials and experts, but as hosts to the entire traveling federal entourage should have placed them above and beyond the petty persecutions to which they were to be subjected on cross-examination by the adversaries of the oil and gas industries.

That many of the views presented would not coincide with those of the federal commissioners was to be anticipated; and the commissioners present were marked in their respect for honest differences of opinion. But not so with the hired attorneys of the railroad, coal and other interests that would obstruct the free flow of natural gas in interstate commerce. They monopolized the cross-examination. In arrogance of manner and contempt of tone, on repeated occasions they implied their mistrust of the competence and, we believe, even of the integrity and sincerity of the state's witnesses.

It is to the everlasting discredit of the Federal Power Commission that it has permitted the proceedings to take this unfortunate turn; and it is, to say the least, a lasting tribute to the forbearance and dignity of the Texas witnesses that they did not withdraw the state's whole presentation and quit the proceedings.

The spectacle of a courtroom crowded with dignitaries and state officials, industry experts and executives waiting in silence while the elementary, primitive facts of gas and oil production were patiently explained again and again to capriciously obfuscating counsel for the chronic intervenors, is one to which the citizens of a free state should not be subjected.

If the Commission is sincere in its contention that it is attempting to conduct a fact-finding inquiry, and not referee an inquisition, then it must render considerably more than pious lip service to its own obligation. That obligation we believe is clear. The Commission, and more particularly the commissioners in attendance at any future hearings, must proceed forthwith to restore to the proceedings the air of judicial calm, the atmosphere of temperate and cogent cross-examination that should characterize an investigation of such grave and far reaching import.

We believe that the professional intervenors, that shadowy insubstantial and nebulous group that is never seen save in the person of its lawyers, have already done a great disservice to the cause of truth in the natural gas investigation. We believe that by their reckless and irresponsible waste of time, their non-judicial personal conduct and their utter disregard of honest objectivity, these representatives of the obstructionists have forfeited the right to any further consideration on the part of the Commission.

We believe that the good of the public, of the Congress and of the industries whose interests are most closely affected dictate that they should be forbidden the privilege of further oral cross-examination, and that henceforth they should be required to examine witnesses only through the medium of written questions, submitted to and put by the Federal Power Commission's own legal staff.

Perennial Problem

ONE of the hardiest of all the poisonous perennials that blooms on the back stoop of the gas industry is the question of the formal attitude that should be adopted toward the installation and use of unvented appliances . . . and particularly space heaters.

In times past executive allergy to this problem has mounted to heights that forbade the very mention of the words carbon monoxide. But while the industry may have displayed considerable dereliction in grappling with the question of venting appliances, it is noteworthy that neither the public at large nor the professional traducers of gas, the perfect fuel, have ever been motivated by such polite but pointless restraint.

Now comes the city council of Pittsburgh, Pa., proposing an ordinance, to be backed up by fines and jail sentences, under which it would be practically impossible

to install or use an unvented gas heating appliance in a private dwelling. Sponsored by the Safety Department of the city council, the so-called anti-monoxide ordinance narrowly escaped routine passage without opposition late in January. It is noteworthy that the headline writers for the Pittsburgh papers use the term "The Silent Killer," an expression which, even in our limited lexicon, has a slightly more sinister ring than the eschewed word monoxide.

Hastily organized, last-minute opposition to the railroading tactics which appeared to be behind the proposed municipal legislation succeeded in having its consideration postponed until the city council had had a chance to hold public hearings at which proponents and opponents of the measure may be expected to say their say. The outcome of the debate should be a matter of great interest to all gas utilities. Worthy of note, too, are the suggestions of Councilman Thomas J. Gallagher of Pittsburgh, who supported the proposal for public hearings on what we regard as extremely sensible grounds. In part, he said, "Mere passage of the bill would be of small value . . . what's needed is a publicity campaign to show people the dangers of using gas heaters without flues or vents. This publicity can be gained through a public hearing."

The kind of publicity that gas will gain through a public hearing will, of course, not be very much to our liking. It will undoubtedly dwell with enthusiasm on the more lethal aspects of incomplete combustion. And it is our surmise that little or no time will be taken up by discussion of the superior advantages of gas as a domestic fuel. Realists in the gas industry recognize that unless it is properly handled, gas can be every bit as dangerous as electricity. And for this reason it is not fantastic to assume that the utilities in the Pittsburgh area will view with regret the public discussion on the merits of the ordinance, the while they devoutly support the objectives that it is ostensibly drawn to attain.

In viewing the prospect of the passage of this particular piece of local legislation, we are in substantial agreement with the opinion expressed by E. C. Adams, a local manufacturer of appliances and chairman of the A.G.A. Technical Advisory Group for Gas Space Heating Research.

In outlining his views, which must be respected as coming from a technician of many years' experience in the manufacture and installation of direct heating, Mr. Adams told the council, in effect, that sudden lunges designed to legislate scientific perfection in the use of gas are only doomed to failure. "This generation of Pittsburghers has grown up with a tremendous quantity of unvented gas heaters in their homes. They regard these facilities for heating as essential, and I do not believe they will discontinue them in any great quantities until other heating facilities can be provided . . . a strict ordinance and attempted enforcement . . . previous to extensive education to explain the need for such action will result in hardship, confusion and resentment on the part of the public.

"I believe the fatal accidents which have occurred could have been avoided if the occupants of the dwelling had even a superficial knowledge of the hazards of heating in a closed room with an overloaded, unvented gas heater burning."

That the gas consuming public in territories where space heaters are in common use can be generally unaware of the hazards so pictured must be examined first in the light of possible dereliction on the part of the gas companies in failing properly to advise and warn gas consumers of the precautions that they all must observe in the interest of their own personal safety.

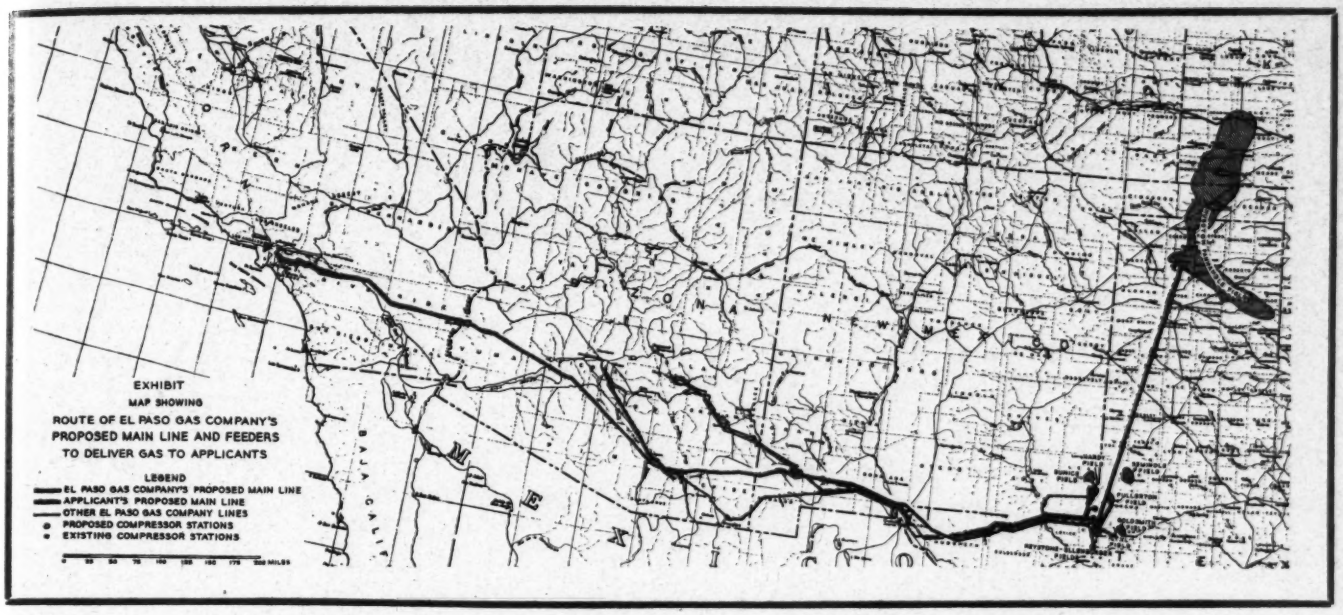
We are well aware that there are numerous aspects to be considered in any discussion of the problem of compulsory venting of gas heaters. But as a matter of governing principle, we do not believe that the gas companies can afford to condone any practices that are inimicable to the interests of personal welfare or property regardless of the commercial aspects involved. That this attitude is gaining recognition is evidenced by the investigation now going forward under the A.G.A. sponsored project at Purdue University on the venting of direct heating appliances.

We are confident that the current interest in this subject of vented and unvented heating will result in a crystallization of views that may come to be regarded as the industry's official stand with respect to venting. For our part, we feel that every gas executive would rest more easily in his contemplation of public relations, could he foresee the day when unvented direct heating would be considered as archaic and as impossible as an undrained plumbing fixture.

But pending the arrival of that day, which may or may not be just around the corner, we hold to the conviction that it is impossible to overeducate the public in the healthy respect that they should have for any products of combustion. To say that such warnings as applied to gas may be used with damaging effect by the purveyors of competing fuels is nothing but nonsense. There was a time when the users of portable electrical appliances were rubbing themselves out in numbers so monotonous that they failed to even make the headlines. But a vigorous campaign of education and warning, which the electrical industry has unceasingly plugged, has convinced a great majority of the consumers that improper use of appliances is nothing but a short circuit through to the embalming parlor. And as a result electrocutions by portable bathroom heaters, for instance, are said to be on the decline. And as far as we can see, electricity for the household seems to have retained a large measure of its popularity with the householder, despite the danger inherent in its improper use.

About safety in the consumption of its own fuel, the gas industry needs admit no more or claim any less. Accidents don't happen; they are caused—and it is as true in the home as it is in an industrial establishment. If popular education of consumers can eliminate the root causes of accidents, how feeble would be the argument in favor of silence, and how insignificant any slight commercial prestige that might be suffered. It is only on very rare occasions that the avoidance of an unpleasant truth serves any purpose other than to postpone the inevitable awakening. And if the awakening takes legislative form —it is only because the public has come to recognize the necessity for the remedial or precautionary measures proposed.

Whether or not the proposed new law would have any great effect on the vital statistics of the city of Pittsburgh, we are not prepared to say. But if Pittsburghers are still in ignorance of the proper way to install and use their gas heating appliances, then it should not be incumbent on the city council to pass laws that would enable them to live safely with their favorite fuel. That obligation rests on the shoulders of the gas industry, the utilities and the appliance manufacturers and their dealers.



Out-of-State Gas for California

By ROY A. WEHE
Assistant Director, Public Utilities Department
Railroad Commission of the State of California

THE bringing of out-of-state gas to California has moved one step further towards realization—for during the third week of December the California Railroad Commission held a public hearing in Los Angeles on the joint application of the Southern California Gas and the Southern Counties Gas companies for a certificate to construct, operate, and maintain a gas transmission line to extend from Los Angeles to the state line near Blythe, Calif., where it will connect with a new line to be built by the El Paso Natural Gas Co., the latter extending to and tapping the Permian Basin and Hogoton fields of New Mexico and Texas.

The hearings, extending over a 3½ day period, created considerable interest and were well attended, though few appearances were made and none in opposition to the project. It may be said that the applicants presented a very complete and thorough case, including extensive testimony as to the availability of gas in California, and load requirements, as well as the reserves and availability of the fields from which the gas supply is proposed to be taken—the later through witnesses from the El Paso Natural Gas Co. The state of California, through the staff of the Railroad Commission, limited its direct showing to an estimate of the state's known gas reserves.

Inasmuch as this project is essentially interstate in character, involving the movement of gas from one or more states to another, the basic regulatory control of the lines, including the wholesale rate that the California companies must pay for the gas, rests primarily with the Federal Power Commission as provided for in the Natural Gas Act, and as interpreted by court decision. This being the case, both the California companies and the El Paso company have filed their applications with the federal Commission for the necessary certificates to proceed with the project. It is expected that early hearings will be held and these may be in course or completed at your reading of this discussion. The program calls for the actual delivery of gas to start by the middle of 1947.

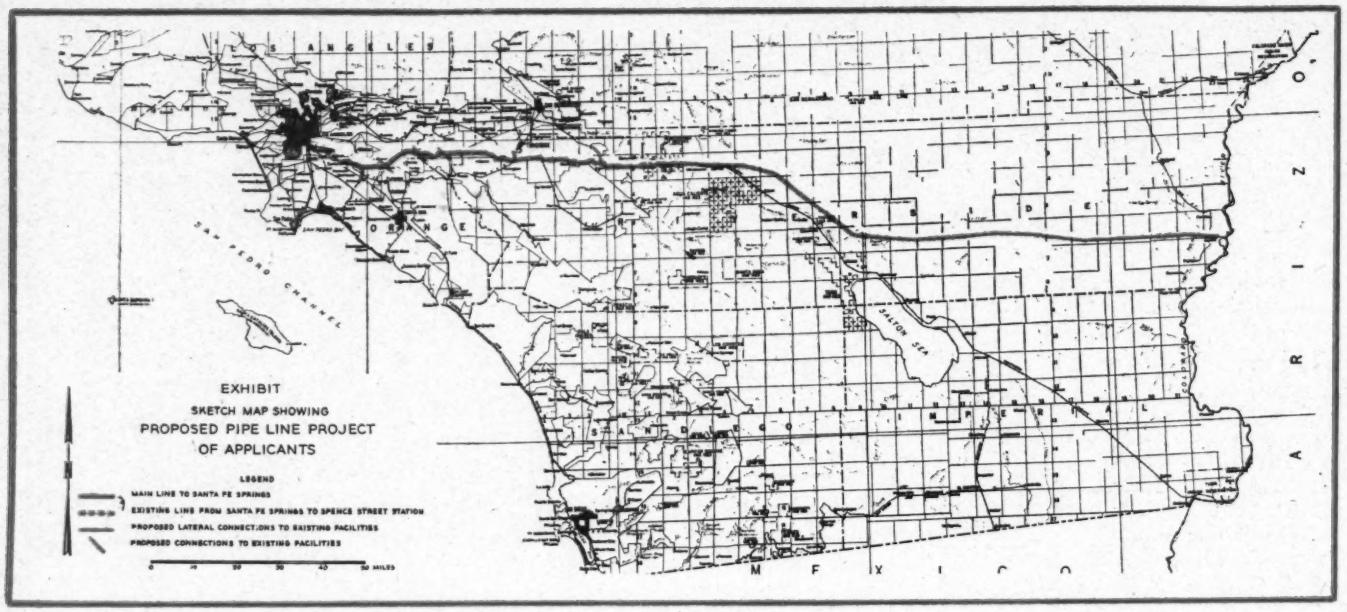
R. A. Wehe

THE FIRST STEP toward bringing to reality the delivery of Mid-continent gas to California took place on Feb. 5 when the California railroad commission approved applications from the Southern California and Southern Counties Gas Cos. to construct, maintain, and operate a 214-mile pipe line between Los Angeles and Blythe, Calif. This line is to connect with facilities to be built by the El Paso Natural Gas Co. to bring gas from the Permian Basin, Hugoton, and Panhandle fields. The second step toward initiation of construction will take place on Feb. 13 in Washington, D.C. when hearings on applications from the three companies will be held before the federal power commission—Editor.

Physical Features of the Project

The following general prospectus of the physical features of the project may be of interest. First it may be observed that due to the manner in which it is to be built, operated, and owned, the project naturally divides itself into two parts, that which lies in California, and that outside of the state. The main line is to be 26 in. in diameter, of which 214 miles are in California, and 720 miles lie outside and end at the Jal No. 1 plant in the southeast corner of New Mexico. In addition, collecting lines in the fields and north from Jal to the Hugoton field to be built are given as approximately 164 miles and varying in diameter from 14 to 24 in.

Compressor stations having initial installed horsepower of 6400 and 10000 are to be built at the Jal No. 1 plant and near Blythe, Calif. Likewise, a purification and dehydration



plant is part of the Jal site installation. Increase in compressor capacity at other locations along the line will be required as deliveries are increased.

The contemplated delivery pressure at Jal is 750 lb., and at Blythe and at Santa Fe Springs 250 lb.

The contract with the California companies contemplates the following delivery capacities at Blythe:

	MMcf per Day	
Year	*Demand Maximum*	*Average Obligation*
1st	125	114
2d-4th	175	160
5th	230	209
After	305	277

It is interesting to observe that an extra payment is provided for in order to insure a minimum heating value of 1050 Btu (wet basis) during the first five years when all the gas is expected to be secured from the Permian Basin fields. Gas from the Hugoton field may not have a heat content less than 950 Btu (wet basis).

Cost of Project and Contract Rate

The estimated initial investment for maximum demands up to 175 MMcf per day is approximately 38 million, of which something less than 12.5 million will be made by the California companies. At least another 14 million will be required if ultimate capacity deliveries are taken.

It may be of interest, too, to observe that the two California companies are undertaking their portion of the project and obligations under the contract as tenants in common. Both companies are under common control.

The contract for gas deliveries by the El Paso company at Blythe provides for a two-part rate made up of a maximum contract demand charge and a sliding scale commodity rate. The rate is subject to future adjustments, depending upon cost and certain other economic factors. The initial rate is as follows:

Demand Charge

Per Mcf. of Maximum contracted Daily Demand	$1.00 per mo.

Commodity Charge

1st 500,000 Mcf. per mo.	$0.15 per Mcf.
Next 500,000 " " "	0.11 per Mcf.
Over 1,000,000 " " "	0.095 per Mcf.

The El Paso company is obligated to deliver and the California companies to pay on deliveries equal to 91% of the maximum contracted daily demand, i.e., the annual load factor is set at 91%.

The average cost per Mcf at Blythe under the second year of the contract at a 14.73 pressure base is estimated to be 13.68¢, while the cost delivered at Santa Fe Springs, including a 6% return, is 17.524¢. This becomes 16.55¢ on a 1100 Btu basis.

The agreement is to be effective for a period of 30 years.

As heretofore stated, the initial supply of gas is to come from the Permian Basin fields. Evidence[1] submitted at the California hearing indicated that from 10 of these fields current oil-well gas production is running about 500 MMcf per day, of which some 48% is vented to the air and wasted and other 20% is used by carbon black plants. The unproduced known reserves were estimated at approximately 7.6 trillion cu. ft. at 14.65 lb. It was likewise estimated that the residue gas from casinghead gasoline plants that conservatively could be made available, and is now unused from a portion of these fields, would approximately 150 MMcf a day for the first five years, with gradual declining amounts thereafter. It was further represented that considerable additional amounts of gas were available from dry gas wells now connected and controlled by the El Paso company in Lea County, New Mexico.

To augment the Permian Basin gas, beginning perhaps after the first five years, the contracts call for gas from the Panhandle and Hugoton fields. It was estimated that the reserves under control of the gas subcontractors were in excess of 5 trillion cu. ft. Thus it appears there is provided a very liberal margin over requirements —without giving weight to possible new discoveries.

California Reserves

As previously stated, the gas reserve situation in California was presented by the staff[2] of the California Railroad Commission. It is believed correct to say these estimates have been made with more than ordinary care and are based upon extensive analysis and correlation of basic data made available in part by the oil companies. The original estimates were made as of Jan. 1, 1941 and 1942 and re-estimated as of July 1, 1945. It may be observed here that the gas utilities do not own nor do they produce gas, but all gas is purchased from oil companies. It is thus apparent that the production control rests in primarily with the oil producers.

Space will not permit an extended discussion of these reserve estimates.

(1) A. F. Dixon, a consulting petroleum geologist and engineer of the El Paso company, presented the reserve and availability estimates.

(2) John F. Dodge, consulting geologist, California Railroad Commission, and F. C. Hodges, petroleum engineer, Division of Oil and Gas, Department of Natural Resources, made the estimates.

The estimates, for the known reserves as of July 1, 1945, in trillions of cubic feet are:

Casinghead gas reserves	7.061
Dry Gas reserves exclusive of storage	4.694
Dry Gas fields used as underground storage	0.050
	11.825

It is pertinent to know that the geographic location of the fields is such that the dry gas reserves, except for minor fields and the underground storage, are not normally tributary to the southern California market. (The Rio Vista dry gas field, north of San Francisco, with an estimated reserve of 3.618 trillion cu. ft., is the largest known reserve in the state.) Because of this situation some 97% of southern California's gas supply is dependent upon oil-well gas production.

Availability and State Gas Requirements

While we all know that in the first instance there must be a gas reserve to draw from, of equal or greater importance at any time is the availability of that reserve, and at what rate it can be produced. From the public utility view and that of its customers, it is the net gas that becomes available for distribution and use that is all-important, along with how long a time can such availability be depended upon, and how long will the supply last to sustain the present market and to meet the growing demands of the market. These indeed are the questions that must be considered and a solution worked out, especially where the demands are in excess of the supply.

The latter is the situation that is fast approaching, if not already present, in the southern part of the state, and, incidentally, is the reason for taking steps to bring in out-of-state gas.

The state's immediate gas problem is to augment the rapidly declining oil-well gas supply to southern California. The northern market, with its center of demand located in the greater San Francisco Bay area, is self-sufficient for the near term future inasmuch as its chief source of supply is the Rio Vista field. Lest someone may inquire why this field is not tapped to move gas south, may it be said that, first, the average annual daily rate of withdrawal is already very high, amounting to in excess of 400 MMcf with peak days ranging to considerably more than 150% of this figure. If such production is kept up we may well never recover the reserves now estimated. Further, if increased withdrawals were feasible, through additional wells and eventually compression facilities, the earlier field depletion would not justify the additional investment in pipe lines and related facilities to move the gas south.

With this somewhat sketchy background we may now turn to a consideration of gas availability and requirements for southern California.

Oil-well gas is of course dependent upon the rate of oil porduction. The state's oil production, in common with other states, has already been cut back since V-J Day, and is estimated to be still further reduced. The disturbing feature, however, is that, while supply and demand will probably be stabilized by 1947, yet oil production will likely continue to decline based essentially upon the physical limitations of the producing fields. (Our known oil reserves are understood to have a lesser future expectancy in terms of market requirements than our gas.)

Along with this reduction in gas from oil there is another withdrawal of considerable magnitude. This latter is due to the fact that an increasing amount of gas is being reinjected in the structure through recycling and pressure maintenance operation in the interest of oil conservation. Inasmuch as such projects are engineered to extend over periods of from 12 to 25 years, that gas, except under very special conditions, is removed from the market and is not available to the utilities. Applicants'[3] estimates indicate that on the average approximately 491 MMcf of oil-well gas a day was available to them during 1945, and that for 1946 this will be reduced more than 20%; by 1950, less than half of this amount will be available. If the average availability of dry gas be added, the 1945 figure of 491 is increased to only 507. In later years a lesser amount will be available. However, as will be shown under demands, dry gas reserves, along with storage, is held for peak-day operations, and the average daily figures have but little significance other than to show the small volume of dry gas on hand on an annual basis.

Gas company sales and therefore requirements may be classified under two broad headings, namely "firm" or customers' load which must be served at all times, and "interruptible," or load which may be shut off when there is insufficient gas to meet "firm" customers' requirements and when gas is not needed for storage. In annual sales volume the "interruptible" has amounted to over half of the utility sales in the state. On applicants' systems it is now about 38%. Such sales are at a maximum during the summer period and a minimum in the winter months. A utility's system must of course be designed to meet its maximum firm customer requirements and provide a margin for load growth. Interruptible gas sold at marginal rates has, in the past, made for economy in utility operations through improved system load factor, and has been a factor in reducing gas wastage in the field.

Estimates for 1948-49

Applicants' estimates indicate that from sources now available there will be little or no gas for interruptible sales by the 1948-49 period, and from the middle of 1949 on there will be an increasing annual deficiency in gas to meet its expected firm gas requirements. This view is all predicated on the balancing of supply and demand on an annual basis. As we know, the requirements are by no means that simple, for gas demands vary sharply from averages. For instance, in 1947 the minimum daily firm demand may be as low as 150 million, while the maximum under low temperature conditions may reach nearly 800 million. Under such conditions aplicants estimate there will be a deficiency, even though a 380-million oil well and dry gas availability is augmented by some 270 million from underground storage.

Happily such peak days occur only once in five or seven years, and when they do their duration is usually limited to one to three days. However, there are many days that occur intermittently for periods of a week or more over several months where the requirements may be from 1.5 to 1.75 times the average demands. In these periods the demands[4] will be in excess of the available supply if storage gas is not available. Data presented by applicants indicate that by 1949 yearly storage withdrawals will be

(3) The principal witnesses for applicants were: Ernest K. Parks and Roy M. Bauer on gas supply and availability; Arthur F. Bridge on a general correlation of supply and demand; Fred Hough, on line design; Ben Laulagre on capital costs; H. P. George on line operation; and F. S. Wade and Paul Kayser on feasibility and financial aspects of the project.

(4) Figures on supply and demand are exclusive of the requirements of the municipal gas system of the City of Long Beach. Figures, however, do include the requirements of San Diego and all the balance of southern California.

sharply in excess of replenishments, so in a few years the largest of the underground reservoirs would not only be exhausted but probably ruined due to water encroachment.

Need for Additional Gas

Under the conditions that the southern California area is facing there can be no question but that an additional gas supply is imperative. The proposed out-of-state gas ranging from an average of 114 million per day, the first year, to 277 million, after the fifth, should readily be fitted under the load curve. Inasmuch as the date for initial delivery is not until the middle of 1947, the 1946-47 season could well become a critical period. The total available supply in relation to the demand in each of the years from now until 1950 and increasingly more so thereafter, will be less than it is today. In other words there will be, assuming an out-of-state supply, a continually decreasing amount of gas for the interruptible industrial consumer and a smaller margin of supply for the firm. It unquestionably will be the aim of both the utilities and the regulatory authorities to see that the very highest use is made of all gas by continuing to keep the state's present fine record of blow to a minimum (now under 2%), by putting the maximum amount of gas underground in summer for winter use, by developing a sound fuel policy for large industrial consumers, and by equalizing gas operations in the two main geographical areas through coordination.

Effect on Local Oil and Gas Producers

Initially, the oil producers seemed to feel that an out-of-state gas supply might tend to make for a less favorable price structure for gas at the well or from casinghead plants within the state. Price for gas varies roughly from about 5 to 12¢ with an average of about 8¢ to the producer in the field. As initially stated, this out-of-state gas will cost not less than about 13.7¢ at the state line, over 200 miles from its market, corresponding to at least twice the average haul from the local fields. (If both figures were adjusted for uniform pressure of delivery and heat content the 13.7¢ would be reduced somewhat.) It is also probably true that the estimated cost to bring the gas the last 200 odd miles is less than that generally realized by the utilities from state sources due to the higher load factor of the proposed operations.

There is of course the other factor of supply and demand, and with an added supply the producers may not be in quite as strong a position to demand a higher price, although from all indications the gas situation has changed from a buyer's to a seller's market. As a matter of fact, higher prices are now being worked out for local gas involving new contracts and where below-average prices have heretofore existed, taking into consideration location and delivery pressures. Also new higher prices are being paid for call gas on peak days where such gas is diverted from pressure maintenance operations. In addition, it must be remembered that gas prices that are geared to fuel oil prices were frozen by the OPA in 1943 (the price of oil was permitted to be increased 25 cents per bbl.), and when this freeze is removed, many contract prices will rise. Surely the price that California producers are receiving must seem like a fairy tale to most mid-continent operators.

A fair price should never be too dear a price and an adequate price is unquestionably the most powerful factor in bringing about conservation as well as an incentive for new exploration, and hence new supplies. Nevertheless, the oil industry should appreciate that increases should be gradual, as sharp vertical rises would seriously disrupt the present utility economy involving some 2 million customers. It is interesting to note, too, that for each 1¢ increase to the producers there would result an annual increase in utility expenditure of nearly $3.75 million. It would also seem that considerable discretion would need to be exercised by the producers in taking advantage of the present supply-demand situation, as one certain way to invite regulation is to seriously interfere with the very considerable public interest involved.

Effect on Industrial Gas Consumers

It is of course folly to say that this group will be in a less favorable position after the introduction of a new gas supply. While it is necessarily true that no new capital and costs can be initiated to supply an interruptible service at incremental rates, yet firm industrial users will be in an improved position including even the curtailable group, inasmuch as some added gas for a portion of the year will probably become available to the latter. Then, too, a portion of this class will change to firm service. In this latter class there are many groups where the gas service has a high utility value—including such industries as baking. As contrasted with this, the local supply would be so limited as to necessitate complete shut-off for most of the large users—and eventually to all. Since the average interruptible rate is now but 14.5 or 15¢, and a 20¢ rate or more would be required to equalize it with oil, it is seen that this group cannot expect to continue on such a rate basis. When the OPA freeze is removed, a considerable portion of this disparity will be corrected.

Conclusions

The gas supply to the southern California market is already shy and inadequate to meet peak-day demands. Due to a declining future state supply and growth in load requirements, the deficiencies will increase and will become critical in the next few years, if the supply is not augmented. The load estimates made by the two southern utilities appear conservative to the extreme, and it is my view that actual requirements will be much greater. Offsetting this, however, there should be new gas discoveries, and in addition some of the gas now used by the oil industry and even some of that currently being re-injected could be made available at a price. Having in mind all these conditions and others, there seems to be no question but that an out-of-state supply in the amount contemplated is urgently needed and such gas, if brought in, can be used most advantageously. If made available by 1947 our own resources can be more effectively utilized.

From an out-of-state point of view it would seem that the project is likewise most advantageous.

(1) It provides a new market for a gas that is in part now wasted.

(2) It provides an earning and a return to both producers and states that produce the gas.

(3) It brings about gas conservation and thus improves the national economy.

(4) It promotes and increases employment.

With California's long record of fair and able control of intrastate utility operations, federal authorities should have little hesitancy in authorizing the project from the point of view of proper safeguards within the state. Likewise, the broader aspects of the problem seem predominately to justify its authorization.

FPC NATURAL GAS INVESTIGATION

(Houston Hearing)

By ELLIOT TAYLOR, Editorial Director

ANOTHER chapter in the inquiry out of which the Federal Power Commission hopes to enhance its admittedly inadequate knowledge of natural gas affairs was unfolded in the hearings opening in Houston, Texas, on Jan. 28. The cordial reception to guests that is traditional of the state was everywhere in evidence, but it did not obscure for an instant the obvious alarm and mistrust felt by the oil and gas officials of the state, at the possible encroachment of federal power contemplated as an end product of the Commission's Docket G-580 investigation of the natural gas industry.

Common Problems

In opening the Texas hearings, Nelson Lee Smith, supervising commissioner, again reiterated the official attitude of the Commission that the investigation provides "us all with a needed opportunity to sit down together in a cooperative spirit to explore our common problems". In what was regarded as an attempt to correct a bad impression made by Chairman Olds when he stated before a Congressional committee that certificate applications not of an emergency nature would be held up until after the Docket G-580 investigations had been concluded. Commissioner Smith said, "It should be evident . . . that the Commission could not appropriately or lawfully adopt a policy of standing still over a period of months by failing or refusing to perform its plain duty under the Natural Gas Act. When the Commission instituted the Natural Gas Investigation it did not . . . suspend the operation of the Natural Gas Act for an indefinite period of time."

As was anticipated, the question of end-use restrictions as a device whereby absolute control over oil and gas could be wielded by some central authority, was a pivotal point of concern to all of the Texas witnesses. Speaker after speaker referred to implications inherent in the New York Natural decision, the Memphis case, the Hope case, and others, but with particular reference to the Norther Natural Gas Co.'s application denied to serve natural gas to a small coal-burning power plant in Boone, Iowa. Perhaps in reference to the nation wide furor that has been set off by the denial of this application on the grounds that it would "displace approximately 30,000 tons of coal annually", the Commissioner observed in his opening remarks that, "When decisions are rendered in certain cases of limited scope—as in specific certificate applications—according to the particular facts and circumstances relating directly thereto, there is a perhaps somewhat natural inclination for the parties who are especially interested . . . to read into such decisions generalized inferences as to the broad questions which are presented in the G-580 proceeding . . . conclusions which are reached in the light of the particular circumstances involved in such individual situations are . . . restricted to the facts adduced on the record in those cases. They do not afford a reliable basis for speculation or prediction as to the conclusions which may in the proper course be reached by the Natural Gas Investigation."

Indirect Nationalization

Whether or not the previous actions of the Commission had been regarded as affording a "reliable basis for speculation", the first witness, Governor Coke Stevenson, warned the Commission that it must keep hands off purely intrastate jurisdiction over the oil and gas business in Texas. "I have no fear," he said, "that the natural gas industry will be nationalized by any legislation. . . . The real fear however, is that such a nationalization may be achieved indirectly and with 'conscious obscurity' and with a finesse designed to hide a knowledge of such a program until after its practical accomplishment. . . . It cannot reasonably be expected that we will quietly submit to federal control over producing, gathering and processing of this valuable state resource. We believe that in this field the rights of Texas are paramount and that the federal government should abstain from any exercise of power therein."

Olin Culberson, chairman of the Texas Railroad Commission, Ernest O. Thompson and Beauford Jester, members of that same body, presented lengthy statements designed to state clearly the position of the state with regard to any proposed or existing federal regulation, the interest in and importance of these natural gas resources to the state, and the progress in conservation that has been brought about under the direction and authority of the Texas Railroad Commission.

State Versus Federal Control

Chairman Culberson recommended specifically that Congress clarify the Natural Gas Act so as specifically to exclude the Federal Power Commission from any control over the production, gathering or conservation of natural gas. Speaking from his experience of many years as an advocate of conservation measures, he said "ultimate outcome of federal control over gas will be the complete domination of the oil and gas industry by the federal government. . . . It would be contrary to the best interests of the State of Texas, and we believe that it would be contrary to the best interests of the nation". He does not believe that Texas gas should be "squandered by being taken out of this state at a cheap and inadequate price in competition with coal and other fuels in those regions of our country which possess large coal or other fuel reserves". In the chairman's opinion, which he stoutly maintained throughout cross examination by the coal and railroad attorneys, "The power of the state is ample as the occasion arises, to control and regulate the production of gas so as

to prevent physical and economic waste."

Commissioner Thompson took the stand that natural gas should be allowed to compete with any fuel in any market so long as its exportation to and delivery in that market proved economically feasible. The most superior use of gas, in the opinion of Commissioner Thompson, is that which commands the best price where production is controlled so as to prevent physical waste and secure maximum recoveries. Regarding price, he said, "Conservation and price go hand in hand. An increased field price for gas would be the greatest conservation measure that could be adopted."

The Commissioner is optimistic about the future of gas prices, saying that in his opinion new contracts will be negotiated at a going price of around 10 cents per thousand at the well-head.

Fair Market Price for Gas

Commissioner Beauford Jester urged that the price fixing policy of the FPC should recognize that the current price of Texas gas at the wellhead is too low. Commenting on the implications of the Canadian River decision, he said "In the proper regulation of interstate gas lines it is fundamentally wrong not to recognize a fair market price for gas at the point where gas is received by the interstate carrier. . . . To the extent that the actual-cost formula of the Federal Power Commission may contribute to the freezing of well-head prices of gas at their present subnormal and unjustifiable levels, we believe such order and formula . . . unjustifiable and should be immediately corrected."

Variations of this same contention were heard from many sources during the hearings. S. B. Spurrier, state geologist for New Mexico, in a paper representing the views of his state said, "In fixing the price for which gas is sold in interstate commerce for resale, the Federal Power Commission must be required to recognize (1) in arm's-length transactions, the price paid for the gas delivered to the natural company, (2) in case the natural gas company produces the gas or secures it from an affiliated or subsidiary company, the fair market value of the gas as a commodity . . . ."

S. Maston Nixon, an independent Corpus Christi, Texas, operator, and president of the Texas Mid-Continent Oil and Gas Association, discussed the same Canadian River case saying: "The establishment of a well price of only a fraction of a cent per thousand cubic feet . . . for gas moving into any market, regardless of who may own the wells, contributes to the depression of the general price level for all gas and seriously discourages exploration. All producers must take the risk of going broke and should reap the profits incident to performing the non-utility producing function. In no other way can adequate reserves be accumulated and maintained."

Control of end-use as a conservation measure was denounced by E. DeGolyer, Dallas geologist. In this, his second appearance in the Docket G-580 investigation, Dr. DeGolyer testified that while he had given an ultra conservative estimate of the proved natural gas reserves of Texas to be in excess of 82 trillion cubic feet, as of Jan. 1, 1945, he now believes that "we are justified in considering the gas reserves of Texas to be of the magnitude of 125 to 150 trillion cubic feet."

Dr. DeGolyer's program for the solution of the most pressing problems of gas conservation and regulation, he outlined as: (1) ratable take in the individual fields (2) proration of markets between competitive field and (3) adequate well-head price for all marketed gas."

"If through some tenuous argument you should conclude that control of end use is a conservation measure, let me assure you that it is not. As long as a billion to a billion and a half cubic feet of gas is being flared daily in the State of Texas, the attempt to conserve through restrictions against the so-called inferior uses fails. . . . No use of gas can be inferior to burning it in an oil field flare—which indeed is no use at all". Dr. DeGolyer also warned the Commission that decisions like the Canadian River case will kill or cripple the producing branch of the industry by driving away venture capital which cannot afford to gamble on a lose-all or win-6% proposition.

Controversial Subject

The detached calm of the examiners bench was rudely upset at one of the early sessions when Col. George A. Hill, Jr., president of the Houston Oil Co., took the stand to present a paper with the controversial title: "The Free Play of Economic Forces in the End-Use of Gas," and with an explanatory sub title: "A statement in opposition to the proposed federal control of all energy resources through the end-use control of natural gas by the Federal Power Commission."

"The compass of this paper," read Col. Hill, "will only permit the consideration of two sources obviously responsible for a sustained effort to erect federal power to regiment and control the economy of free Americans by the creation of the all-powerful political instrument of 'end-use' control of energy resources, viz:

(1) The National Energy Resources Committee.
(2) The Federal Power Commission.

Views Defended

The witness contended and defended his view to the effect that: "the Federal Power Commission is advocating the extension to it, by Congressional enactment, of the power to regulate all of our national energy resources by the omnipotent instrument of end-use control for the attainment of unchartered and even capricious political, economic and social objectives, valued in that new and elastic currency of the synthetic creation of bureaucracy known as 'social costs'.

And the two paragraphs that brought down the heated charge, by Commissioner Smith that the witness was making serious charges against the Commission, were read by witness Hill:

"These vaguely pious and innocent declarations and their persistent reiteration and their aggressive pursuit in the present investigation must, therefore, be considered, notwithstanding their subtlety, to the full extent of their most serious indictments . . .

"The Federal Power Commission is in effect proposing new legislation that it hesitates to tender in a definite draft employing legal terms involving the precise commitments that flow from accepted definitions and thereby meet the forthright issues thus easily resolved by the application of the lessons of human experience in the science of government and especially the lessons learned in the evolution of the American constitutional system."

At this writing the witness has yet to be cross examined by the attorneys for the natural gas obstructionists.

By the end of the fourth day of the Houston hearings when only eight of the 22 witnesses had been called, and with the interminable cross examination of all but five of those still to be conducted, it became apparent that only a most perfunctory attention to the views of the remaining experts could be expected. The hearings were announced by Commissioner Smith as scheduled to move on to Biloxi, Miss., on Feb. 11, thence to Chicago Feb. 19. The date of the Charleston, W. Va., appearances has been shifted from March 19, as previously scheduled, to April 2.

CORROSION of Hot Water Storage Heaters

By CHRIS GOLDKAMP
Corrosion Engineer, San Diego Gas & Electric Company

THE CORROSION of hot water storage heaters is one of the most serious problems in customer relations faced by many utility companies. San Diego, Calif., has more than its fair share of water heater failures, and it was only natural for the author to make an investigation into the problem. In this article which has been prepared exclusively for GAS, Mr. Goldkamp outlines some of the causes of water heater corrosion and failure. He concludes that the prevention of such corrosion will require the attention and cooperation of many individuals and agencies including water heater manufacturers, architects, designers, builders, plumbers, civic officials, water authorities and power, gas, railway and telephone company experts in controlling factors contributing to corrosion. As a suggestion, he asks, "Why not treat water chemically to mitigate the corrosion of metals?"

IN no place where metal is employed for domestic use is its wastage so large and extravagant as that caused by the failure of hot water storage heaters.

That these failures are largely due to corrosion is evident from years of study on the part of investigators employed by power, gas, water, telephone, and street railway companies.

These investigations have been brought about by the fact that many plumbers, in attempting to explain to irate customers why a new water heater has lasted for only a few months, have frequently pointed to nearby trolley lines or transformers and said, "Leaking electricity is getting into the pipes and eating out your water tank!"

The plumbers were partly right. The water heater failures were due to an electrical process that was resulting in corrosion, but the source of electricity was seldom, if ever, a trolley or power line.

Because San Diego has had more than its fair share of water heater failures, it was only natural to assume that perhaps the local water was to blame. What other explanation could there be for the fact that the same quality heaters, made of the same materials and subjected to the same use in other parts of the country will often outlast San Diego heaters by months, and even years?

On the other hand, customers often pointed out that their old manually-operated heaters lasted for periods of from 20 to 30 years. This would lead one to believe that water alone wasn't at fault.

Many cities having hard water do not always have the same degree of water heater failures. Studies have shown that it is the extent to which mineral salts are present in quantities sufficient to make electrolysis and corrosion possible. Tests taken of the water at spigots located at the site of the heater failures have shown that the water contained a high degree of conductivity for electricity. Water containing sufficient quantities of mineral salts, in addition to dissolved oxygen and carbon dioxide gases, is the most common cause of ferrous metal corrosion.

Chris Goldkamp, corrosion engineer for the San Diego Gas and Electric Co., holds two intake pipes, both of copper. In his right hand is a new copper pipe; in his left hand is a copper pipe which has been coated with zinc as a result of electrolysis in a water heater.

Tests made on soil by electrolysis engineers have shown a definite relationship to exist between the electrical resistance of the soil and the corrosivity of materials when placed in that soil. Similar tests have been made of the water in San Diego. Although insufficient material has been gathered from which charts can be drawn, there seems to be a definite relationship between the electrical resistance of the water and the corrosivity of the iron water tank. For example, the water in the southern part of San Diego comes from a different source than the water in the northern and eastern parts of the city. The water in the southern area has a resistance of from 1200 to 1400 ohm-centimeters. The water in the northern and eastern districts has a resistance of from 2500 to 3000 ohm-centimeters. In the latter named areas water heaters have been found to outlast those in the former named area by considerable lengths of time.

While the attention of the entire water heating industry and of the A.G.A. laboratories has been devoted to obtaining an even greater efficiency out of water heaters and every bit of heat possible for every cubic foot of gas burned, little enough attention has been given to the use in heaters of those metals which will prevent or discourage corrosion.

Main Causes of Corrosion

One of the main causes of corrosion has been due to galvanic couples. Galvanic couples are formed by the union of two metals whose position in the galvanic series is such that when immersed in the proper solution a current is created.

Table 1 shows a list of metals and their relative positions in the galvanic series. Those metals farthest apart will provide the most ideal elements

TABLE 1. POSITION OF METALS IN THE GALVANIC SERIES

Corroded End (Anodic, or Least Noble)

Magnesium
Magnesium alloys

Zinc

Aluminum 2S

Cadmium

Aluminum 17ST

Steel or Iron
Cast Iron

Chromium-Iron (active)
Ni-Resist

18-8 Stainless (active)
18-8-3 Stainless (active)

Lead-tin solders
Lead
Tin

Nickel (active)
Inconel (active)

Brasses
Copper
Bronzes
Copper-nickel alloys
Monel

Silver solder

Nickel (passive)
Inconel (passive)

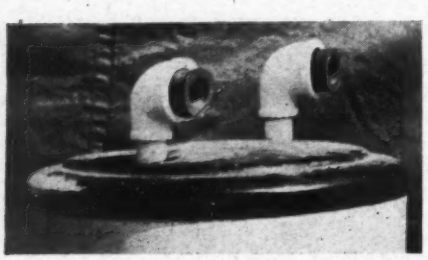
Chromium-iron (passive)
18-8 Stainless (passive)
18-8-3 Stainless (passive)

Silver
Graphite
Gold
Platinum

Protected End (Cathodic, or Most Noble)

for corrosion. When elements farther apart on the scale are immersed in mineral salt solutions, a current is set up from the anodic, or least noble metals, to the cathodic, or most noble metals. The anodic metals lose their metals to the cathodic metals, and in doing so become corroded. The opposite is true in that the closer the elements are together in the galvanic series the less is the possibility that corrosion can exist.

Many heaters have an iron, zinc-coated tank. The intake pipe is of copper, to insure it outlasting the tank and thus prevent the possibility of water bypassing the heating area.



View of the Formica bushing in place in the elbows before the intake and outlet pipes are put in position

From the galvanic series chart it can be seen that when a zinc-coated tank is equipped with a copper intake pipe, two elements are used which are some distance apart on the scale. It is easy for the electrolysis to start. The zinc wastes away and in some waters deposits itself on the copper, leaving the bare iron exposed to the water. The oxygen in the water attacks the iron, which soon corrodes and the damage to the tank is completed. Many tanks have been examined where the copper intake pipes have been coated with zinc. This is frequently the case where the flues of a water heater are the first to go. The flue and the intake are always closer together than the other parts of the tank, and the action here is naturally easier and more rapid. This condition is also characteristic when brass intake pipes are used.

Insulation of Tank

In addition to intake pipes, it frequently happens that many houses have their hot water pipes or even their entire water systems in copper piping. This means that the zinc-coated tank is then vulnerable to the entire household system. The more copper area which is exposed to the zinc, the faster the process and the more rapid the tank's disintegration.

Where such conditions have been found to exist, the water heater tanks are insulated with a Formica insulated bushing, or a flanged insulating joint. These are Bakelite composition bushings which can be inserted into a regular pipe fitting. They are both water-resistant and insulators of electricity. By their use, the connection between the metals is broken, the galvanic couple is interrupted, and the current is reduced to a minimum.

The loss of metal by corrosion in these heaters is insignificant. But only one small hole in the tank will disable an entire heater with its remaining good metal, thus creating an extravagant waste.

Imperfect Coating

Despite the best precautions on the part of the manufacturer, many tanks are not perfectly zinc-coated. Due to the fact that a small bit of lead will sometimes be found on the surface of the liquid in the zinc-galvanizing tanks into which the heaters are immersed, the first zinc coating on top of an iron water heater is quite apt to be composed of a lead-iron-zinc alloy. The final outside coating is nearly pure zinc. Sometimes there are small breaks in the coating, thus leaving a "holiday" on a small bit of iron exposed.

Corrosion of Zinc

As it can be seen from the galvanic series chart (Table 1), the zinc and the iron are sufficiently far apart to start a galvanic action which results in the corrosion of the zinc. The current flows from the zinc or anode into the iron or cathode. The zinc breaks down, and the lead is left exposed. In the meantime, a tubercle is formed over the entire holiday, which completely seals off the area from the rest of the water heater. The action within this tubercle is then entirely independent of the rest of the tank. As it can be seen from the chart, the lead is even further down the scale than the iron. This means that the process is reversed, the current flowing from the iron, which has become the anode, to the lead, which has become the cathode. The result is an even more rapid electrolytical process and corrosion.

Accelerating Factors

The fact that the old manually-operated water heaters outlasted the automatic type gave reason to believe that higher temperatures had something to do with the process. It has been found that where the water has been maintained at 180° F., the corrosive action is twice as rapid as that where the water is maintained at only 140°F. The combination of higher temperature plus an undersized heater affords a splendid condition for corrosion.

The most recent example found in San Diego was a case in which two water heaters had been placed in an apartment. Both heaters were of the same make and type. A large family moved into one of the units; the heater was naturally too small to serve the needs of so large a family. There was seldom sufficient hot water. The thermostat was turned up as high as it would go. The water heater lasted only a short while. The heater in the second unit served an elderly couple who used hot water only occasionally at a thermostatic setting of 140°F. That heater is still in working condition today. It often happens that when heaters are too small to serve the family, the thermostats are turned to their highest points

and the electrolytical process is accelerated.

Water pressure is also an accelerating factor. Aside from the fact that water at high pressure will often "blow" the weakened structures out sooner than they otherwise would have given way, the high pressure water will cause more turbulence within the tank.

The turbulence of the water increases diffusion of oxygen naturally dissolved in the water to the surface of the metal, which automatically creates a condition more favorable to corrosion. If there are a great many elbows, bushings and fittings in the piping, especially adjacent to the tank, the water at its higher pressures and velocity will create even greater turbulence thereby increasing diffusion of dissolved oxygen from the water to the inner surface of the piping and tank.

Preventative Measures

Two ways to prevent this condition have been employed. The first, of course, is to decrease the pressure of the water at the entrance to the house; the second method is to encourage new home builders to provide piping that is as straight as possible, containing few bends and fittings.

As blood corpuscles in the body rush to heal a break in the skin, as the sap in the tree rushes to heal a cut in the wood, metal also reacts to the effects of oxygen by forming a protective scale. This scale naturally covers all the metal surface and will retard the corrosive process. High water pressures and air hammers within pipes will break and crack this protective scale, thus encouraging corrosion.

Although water heater manufacturers warn the user to drain the heater regularly, many fail to take this precaution. It is only reasonable that the residue composed of foreign matter deposited on the bottom of the tank will also contain among other things mineral salts, thus adding to the conductivity of the water. This, of course, means that corrosion is accelerated.

Corrosion Due to Sludge

The sludge that is deposited in the bottom of a tank will often create new chemical constituents which may frequently add to the possibility of corrosive action at the interface of the sludge and water. One would assume from the foregoing paragraphs that most heater failures would be near the top of the tank, due to higher temperatures. But, due to the fact that it often happens that corrosive action will take place very close to the interface of the sludge and the water line, an action is indicated between the sludge and the tank.

Close-up of a Formica insulated bushing. The bushing is inserted between the elbow and the intake or outlet pipe.

Stray Currents

Stray currents sometimes find their way into heaters to add to the corrosion. These currents may originate from nearby trolley lines or from grounded currents that will seemingly come from nowhere, enter the pipes of a house, pass through the water system and water tank, and out of the house again. Sometimes these currents have been traced for hundreds of feet. Some of these currents are restricted in their flow. Frequently the compound used in making threaded pipe connections hardens with age and, regardless of how tight the union of the pipes may seem to be, the hardened compound will form a high-resistance joint, causing a drop in voltage across the joint. The stray currents coming through the pipes of the house will be restricted in their flow and corrosion will form in these joints.

Other currents originate from "long-line currents," which are caused by the varying conditions of the soil through which pipes run. The chemical contents of these soils will differ to such an extent that the electric currents will be set up in the pipes and will flow into the house.

The water-softening processes frequently employed will often prevent corrosive action from taking place throughout any of the water systems of homes. This is not true in all cases, since in water-softening processes sometimes not all salts are removed (depending upon the type of water found) and the elements permitting corrosion will still exist.

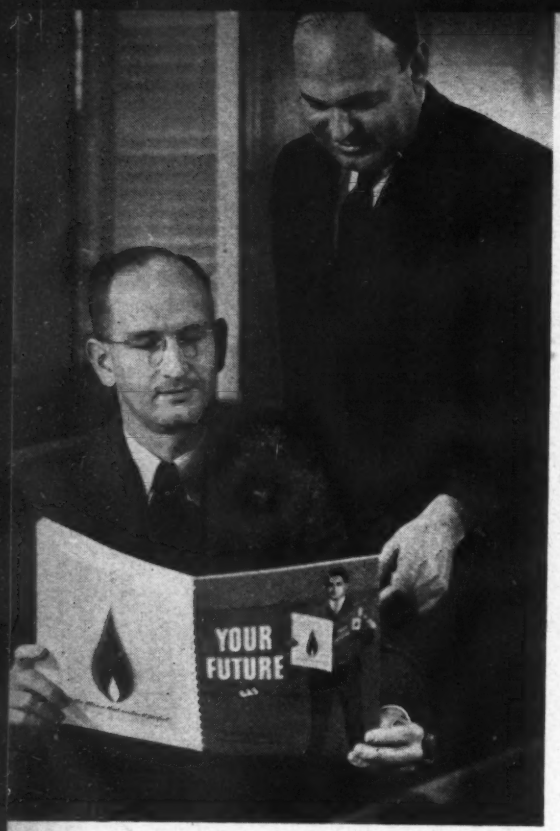
Commercial establishments such as hotels, apartment houses, and restaurants find it to their advantage to install water treatment cartridges filled with sodium silicate or other chemicals to neutralize the detrimental mineral salt content of the water. This in turn reduces the chief cause of corrosion in water heating.

One of the most practical answers from a strictly technical point of view to the problem is the use of monel, copper, or other suitable nonferrous metal for tanks and piping. Also, there is considerable promise of protective value in coatings of vitreous enamel and plastics.

Summary

The prevention of corrosion will follow an understanding of the problems by the water heater manufacturer, architects, designers, builders, and plumbers. It also calls for the cooperation of civic officials, water authorities, power, gas, railway, and telephone company experts in controlling the contributory factors to internal corrosion of water heaters and piping, such as reducing water pressures and encouraging installation of water treatment plants. Through mutual study of the results of research a better comprehension of the problems of corrosion will ensue.

We chlorinate water to protect our health, so why not chemically treat water to mitigate the corrosion of metals?



ABOVE: W. M. Jacobs, manager, General Sales, Southern California Gas Co., and the author.

THE BLUE SEAL

For Sales Cooperation wit

By J. C. Merkle

General Supervisor, Appliance Sales and Promotion
Southern California Gas Co.

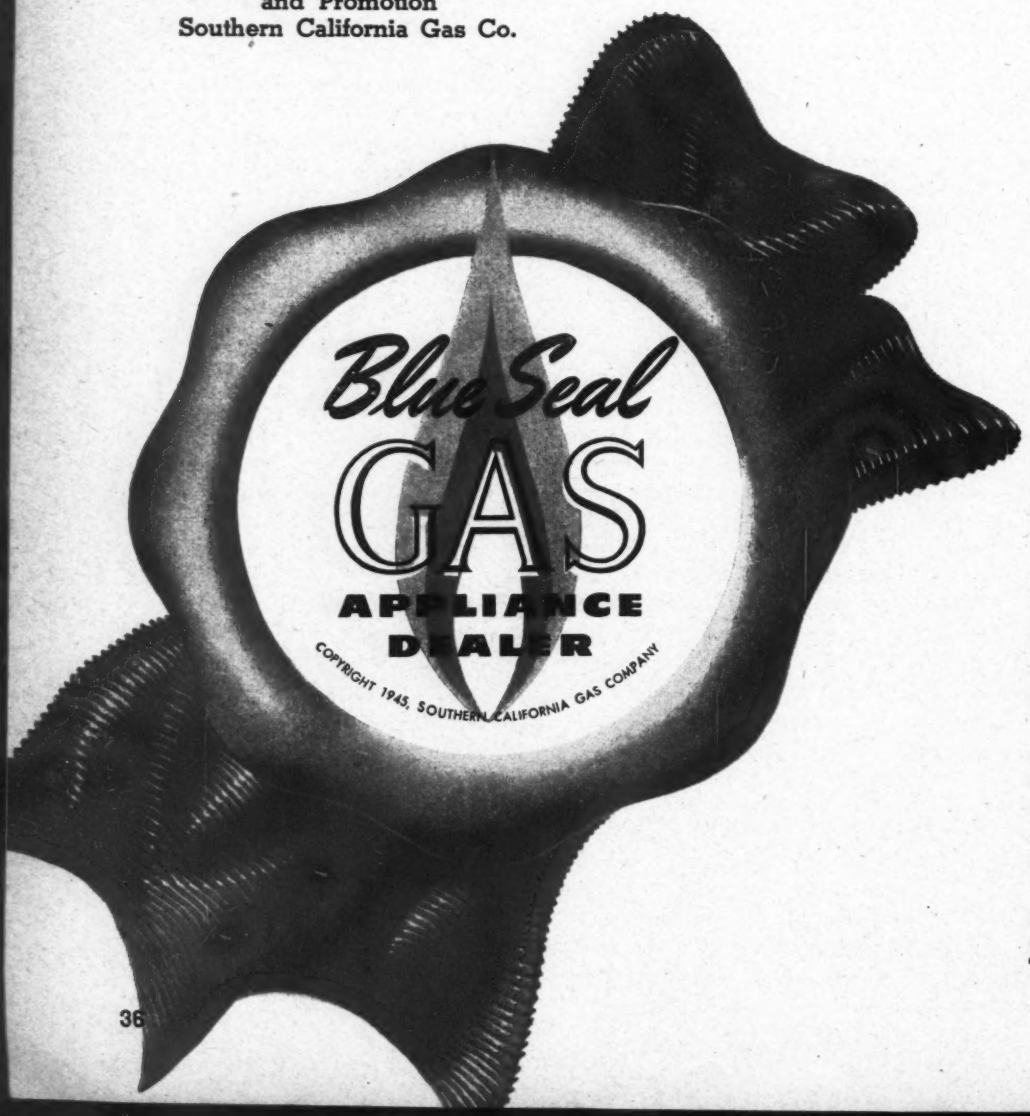
MARKING a milestone in southern California utility merchandizing activities, the Southern California Gas Co. last month presented the recently completed "Blue Seal Plan" for sales cooperation with appliance dealers. Taking as a basis the 11-point dealers cooperation program of the American Gas Association, the company has gone a step further by stating that it *will not compete* with dealers in the sale of gas appliances.

In the words of W. M. Jacobs, manager, General Sales, the plan (1) makes it possible for dealers to do the overall direct selling job; (2) offers the dealer all possible gas company assistance — advertising, sales promotion, sales leads—and even sales made by gas company personnel.

The cooperating dealers under the plan are divided into two classifications, as follows:

1. *The Cooperative Gas Appliance Dealer* is a dealer who will display and sell gas appliances, but who also plans to sell major appliances using other fuels. He will cooperate with the gas company in following certain recommendations for the conduct of his gas appliance business, and in return for his cooperation, the company will make available to him specified selling assistance.

2. *The "Blue Seal" Gas Appliance Dealer* is one who exclusively displays and sells one or more major gas appliances. He may, of course, sell minor home appliances using other fuels. The "Blue Seal" dealer is eligible, by following certain specified sales policies in the conduct of his gas appliance business, for all the selling assistance offered the cooperative dealer plus special sales aids and special profit opportunities made available by the gas company. The dealer will have the privilege of displaying the "Blue Seal" as shown in the illustration.



How The Plan Operates

A "Blue Seal" dealer in any territory is eligible to receive the following special benefits:

1. Sales—The gas company will continue in the postwar period to make sales, but these sales will fall into two categories—*undeclared* sales and *declared* sales.

An *undeclared* sale is a sale made by a gas company representative to an individual who does not mention the name of a gas appliance dealer. In this event, the sale is turned over to the neighborhood "Blue Seal" dealer. The dealer then completes the sale and installs the appliance, his only cost to the gas company being a small selling charge which would approximate what he normally pays his own sales representative.

A *declared* sale is a sale made by a gas company representative to a purchaser who names a specific dealer. This sale goes to that dealer—either a

LAN

pliance Dealers

"Blue Seal" dealer or a cooperative dealer.

2. Prospects—The same general plan is followed with respect to prospects. In other words, the names of "undeclared" prospective purchasers who do not complete sales with a gas company representative are turned over to the "Blue Seal" dealer in the prospective purchaser's neighborhood. Like sales, only prospects declared specifically for a cooperative dealer will go to him.

3. Advertising—The "Blue Seal" dealer will tie in to gas company campaign advertising, advertising that will direct customers to him. Also the gas company will participate in a greater portion of the dealer's authorized advertising costs during special sales campaigns.

4. Direct Mail—Special mailing and call lists will be made available; special assistance will be given with direct mail literature.

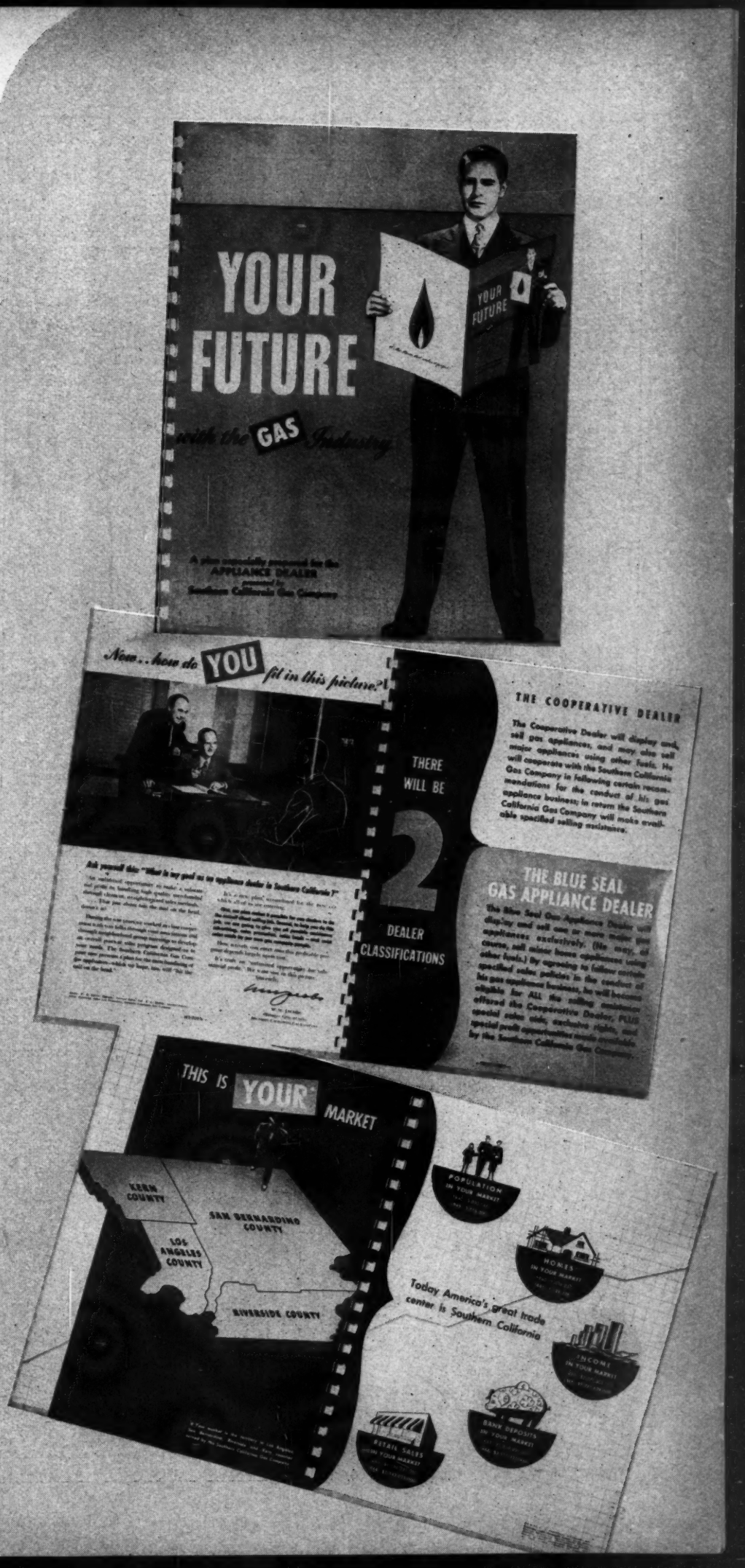
5. Cooking Schools—Direct tie-in and participation in local cooking schools will be held in the dealer's store where space and traffic justify.

6. Sales Promotion—Sales literature, bulletins, truck and counter cards, banners, and other promotional pieces will be made available.

7. Window Display—Special help will be available for solving window and floor display problems. The dealer's name will be in a prominent list of "Blue Seal" dealers displayed in local gas company offices.

8. The Blue Seal—Only a "Blue Seal" dealer will be allowed to display and receive the special benefits of the copyrighted Blue Seal. (See illustration.) It may be displayed on windows; in the store, on trucks; on mailing pieces; and in advertising. "Blue Seal" dealers will be eligible for special listing in the Classified section of local telephone directories.

9. Financing Plan—Favorable financing plans will be available by several financing agencies for the dealer's gas appliance sales. General information on these plans will be fur-



RIGHT: Sample pages from the Southern California Co.'s brochure describing the Blue Seal Plan.

ANSWERS TO DEALER QUESTIONS

On The "Blue Seal" Plan

How will I profit by selling only gas appliances in the major appliance field?

You are eligible to become a Blue Seal gas appliance dealer—and as a Blue Seal dealer, you would receive all the special profit advantages of this preferred plan.

Will the gas company sell in competition with the dealer?

No. Gas company field representatives will sell appliances, but these sales *will go to dealers.* Of course, there may be isolated exceptions in areas not covered by active dealers.

Do only Blue Seal dealers get undeclared sales and undeclared prospects?

Yes. *Undeclared* sales and prospects originating through gas company personnel will be turned over directly to Blue Seal dealers, even though the customer mentions no dealer's name.

How will I be able to use this Blue Seal to my advantage?

Your store will be identified with a large attractive Blue Seal. You can use it in your store, on your windows, in the phone directory, on banners, and in newspaper advertising and for other sales promotion.

How will my appliance sales be financed?

Not just one, but a choice of several financing plans of major financing agencies will be available to gas appliance dealers. A gas company dealer representative will call and give full information.

May I still sell minor appliances using competitive fuel—like radios, toasters, waffle irons, washers, ironers, home freezers, dishwashers, etc. —if I'm a Blue Seal dealer?

Yes. You can still sell these minor kitchen and home appliances.

My customers like these cooking schools. How can I benefit?

As a Blue Seal dealer, you will tie in directly to local schools and demonstrations, through advertising and lobby displays. Or, where space and other factors permit, demonstrations may be held right in your own store.

Will the gas company help pay for my advertising?

Yes. For authorized advertising during special campaigns. And as a Blue Seal dealer, the gas company will participate in a larger share.

Some of my salesmen may be new to the gas appliance business. Will the gas company help them?

Yes. Courses to acquaint dealer personnel with the gas appliance business and to give them specialized sales training will be available to both cooperative and Blue Seal gas appliance dealers.

nished by the gas company dealer representative.

10. Sales Training—Free, interesting courses by experienced instructors will be available to both the Blue Seal and Cooperative dealer sales personnel, directed to making more sales and to reducing selling costs.

11. Continuous Help — Specialized gas company representatives and sales counselors will be ready at all times to help the dealer with his gas appliance merchandising problems.

Presentation and Promotion of Plan

The "Blue Seal" dealer program will not become effective until merchandise is free-flowing. The program was first announced by a 24 x 24-in. mailing piece and by personal letters to each dealer. Following this, the plan was presented through a series of meetings with all types of appliance dealers, including merchant plumbers, furniture dealers, hardware stores and straight appliance dealers. Each of the meetings was high-lighted by the showing of some 75 rapid-fire colored slides describing the essential points of the program, the gas appliance market in southern California, and the profit opportunities which await the dealer who cooperates.

The "Blue Seal" program is presented and summarized in a booklet entitled "Your Future with the Gas Industry" (see illustration) which was prepared under the direction of Robert M. Crosby of the Sales Promotion Department. The booklet features prominently on the inside front cover the 11 guide posts for dealer cooperation as set down by the "Inter-Industry" subcommittee of the American Gas Association. Official sanction is given the 11 recommendations through the publication of the seals of both the American Gas Association and the Pacific Coast Gas Association. The first page of the book is devoted to a message from F. M. Banks, vice president in charge of sales, who states that the new program is an expansion and continuation of utility cooperation in the territory of the Southern California Gas Co. Other sections of the booklet describe the following:

1. Background of the gas utility industry in southern California, its size and the job that was done during the war years.

2. The national, regional, and company advertising and promotion which is behind the dealer.

3. The gas company, services available to gas appliance dealers which include (a) free kitchen planning, (b) the promotion of the all-gas kitchen, (c) home service aid for new appliance purchasers, (d) cooperative cooking schools, and (e) free sales training for dealer salesmen.

4. Profit opportunities and new appliances are described. Special appliances including all year air conditioning, the gas clothes drier and hydraulic dishwasher, are given particular attention.

5. The part that the industry and company laboratories play in certifying the quality of gas appliances is another point stressed.

6. A spread in the booklet (see

Table I. Anticipated Southern California Gas Appliance Market*

General Data

	1940	*1945*
Population	3,023,146	3,715,300
Homes	1,036,837	1,186,226
Income	$2,271,808,000	$5,321,626,000
Bank Deposits	$2,859,946,000	$3,571,237,000
Retail Sales	$1,386,341,000	$2,343,025,000

New and Replacement Market for Gas Appliances**

	Dwelling Units in 1940	*% Replacement Needed*	*New Appliance Market***
Gas Ranges	885,000	53%	285,000
Water Heaters	881,000	22%	294,000
Gas Space Heaters	588,000	All equipment 5 yrs. or older.	282,000
Automatic Refrigerators	600,000	Estimated 20.56% 10 yrs. or older— 26.58% 7 to 10 yrs. old.	30,000 (Estimated 30% want gas refrigerators)

*Kern, Los Angeles, San Bernardino and Riverside counties.
**Based on 300,000 New Homes to be built in next 5 years.

illustration) describes the dealers' market in southern California. Some comparative figures covering both the replacement and new appliance markets are given in Table I.

The Formation and Background of the Plan

The "Blue Seal" dealer program was not developed over night. During the war years, when the gas company was devoting its major efforts toward meeting the demands of industry and maintaining service to domestic customers, there was little or no sales effort, but what time was available for postwar planning was profitably spent in neighborhood meetings with gas appliance dealers. It was at these meetings that the gas company representatives and the dealers "let down their hair" and told each other what each thought the other should do toward working out a mutually agreeable and profitable cooperative plan to take effect in the postwar period. As a result of these meetings, the "Blue Seal" program was developed. Prior to its presentation to dealers, the gas company submitted the plan to the manufacturers who, in general, accepted and approved the program.

The Southern California Gas Co. in the words of Vice President Banks is proud of its "more than a dozen years of cordial relations with gas appliance dealers". In 1934 the company launched its first major cooperative campaign to sell high quality, clock-controlled ranges—and 13,000 were sold in 60 days. The success of that campaign and of the many new merchandising methods which were pioneered in the years to follow was due primarily to the cooperation of the company's dealers.

Canadian Government Aid Urged for Exploration

Five members of parliament, representing constituencies in the provinces of Alberta, Saskatchewan and Ontario, went to bat in the Canadian House of Commons at Ottawa on Nov. 29 for increased assistance from the federal government for companies exploring for natural gas and oil.

The main arguments for expanded support were offered by Arthur Smith, who sits as Progressive Conservative (Opposition) member for the Alberta constituency of Calgary West. Smith said that present government plans to aid the industry should be extended. Another member stressed the need of assistance for those drilling for natural gas in Ontario.

The matter arose during the discussion of a resolution under which companies, in income tax returns, are allowed to deduct 50% of expenditures made directly or indirectly in connection with deep test oil wells which prove unproductive.

At a sitting on Nov. 20, Hon. C. D. Howe, Minister of Reconstruction, during a review of government policy toward relaxing all controls at the earliest possible moment, mentioned that controls on the use of natural gas in Southwestern Ontario would remain in effect during this winter.

Manufacturers Light & Heat Returns to 40-Hour Week

The Manufacturers Light & Heat Co., Pittsburgh, Pa., has announced that effective Jan. 1, its business offices will be closed on Saturdays, as in pre-war days. Offices receiving payment of natural gas bills will be open from 9 a. m. to 5 p. m. Monday through Friday, but the discount will be allowed on bills having a final date for payment on Saturday if the payment is made the following Monday.

Lindemann and Hoverson Withdraw from "CP"

James I. Gorton, "CP" promotional director, announced recently that Lindemann and Hoverson has discontinued the production and sale of gas ranges. The company has resigned from the GAMA, the A.G.A. and the "CP" program.

MECHANIZATION OF CONSTRUCTION & OPERATION PRACTICE

Outlined Before the Pacific Coast Gas Association Distribution Conference, Santa Cruz, Calif., November, 1945.

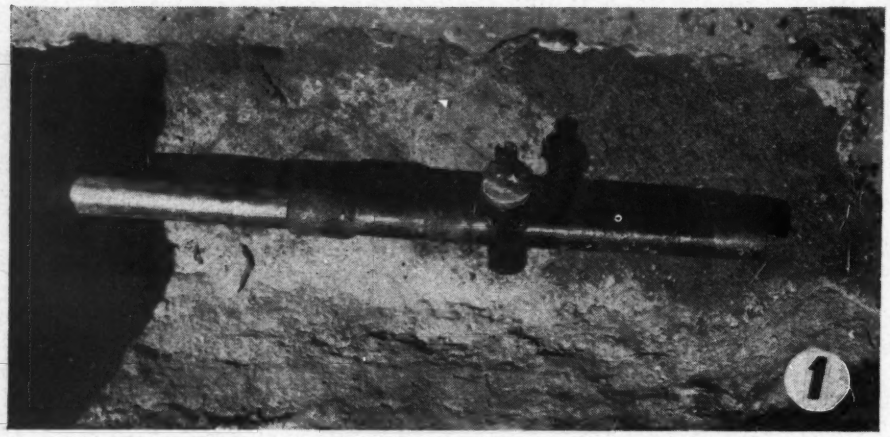
Typical Jobs	*Practices Needing Improvement*	*Revised and Mechanized Practice*
1. Loading and storage of pipe.	Hand rolled down skids. Piled on slats. Wrapping ruined. Dangerous job. No standard procedure.	Handling mechanized with loaders. Storage full length contact, minimum injury. Standard procedure.
2. Hauling pipe.	By contractor on large jobs, no provision for small jogs, but rack on truck. Length limited to about 30 ft.	Trailer, 2 wheeled, with bolster on truck and using binder and hitch.
3. Trenching.	Large % hand dug. Only cross country transmission line jobs tackled. Wide trenches, heavy back fill. Idleness. Hard to move.	Dispatcher, tilting trailer, special design digger. Entrance deflector. Services dug. Curb and sidewalk ditching. Routed to groups of jobs.
4. Fitting and lowering.	Trench tripods, ropes and manpower dangerous.	Telescopic boom.
5. Back filling.	Hand with pneumatic tamping. Flooding loose back fill. Boards with wench.	Small cuts, angle dozer. Roller, all oil pressure controlled.
6. Installation of large volume meter and regulator sets.	Every job custom built, heavy, complicated, expensive, heavy supervision requirements, low salvage value. Hard to estimate, no correlation of parties interested.	Standard design, simple, light, minimum of parts. High salvage, all activities coordinated; quantity production; central test.
7. Service calls.	Tools wet exposed. No plan of storage, difficult to get into. Excess material. Reaming burner parts with ice pick.	Electric reamers; electric vacs; modern boxes.
8. Emergency repairs, main line taps.	No crew or personnel ready. Pick up construction truck and welder.	Special two-man light crews, equipped with arc machine patches, lights and pumps.
9. Shop work.	Small local shops scattered through territory, excess equipment, local "wild cat" projects. Fill in work. No supervision. Heavy varied stock.	Central inter-department shop, uniform work, flow, standard design. Quantity production. Supervision. Control of design. Reduction of supplies in warehouse.
10. Training of new employees.	Put him out with "'an old head."	Central training with training equipment.
11. Routine maintenance and painting.	Hand chipping, scaling. Hand painting. No good on flanges and crevices.	Air sand blast; spray painting—thorough and fast.

HOW TO STOP GAS FLOW WITH

When Exten G

Southern Counties mpa

Special Stopping Uni Solv



In the first step, a slotted coupling is brazed to pressure control fitting cap, then slightly loosened with wrench.

12-in. ¾ nipple is then inserted in coupling and tightened.

IN bygone days when mains were extended, either consumers had to be shut off from the end of the main back to the first shutoff valve, or the extension could be made much in the manner of connecting another length of garden hose while the water is still running. By this second method, of course, free gas spurted into the bell-hole in which men were working and created a hazard that could have caused serious trouble.

A first improvement to this old and cumbersome method was worked out by Southern Counties Gas Co., Los Angeles, in the form of a pressure control tee. This tee, which is a San Gabriel Valley district development, is much like a vertical bottle neck, which is now connected to all mains a short distance from the end. It has a screw cap which can be removed, and a rubber stopper or expansion plug that can be inserted to stop the flow of gas when the main is to be extended.

The "stopping unit" is then installed over the pressure control fitting cap and the pipe extension by which the cap can be turned later. Both barrels are then sealed and the cap lifted above horizontal barrel.

Intersection of horizontal barrel is then sealed off by pushing in a rubber expansion plug, after which vertical barrel may be opened to remove pressure control cap by means of the ¾-in. pipe extension.

T LEAKAGE

n Gas Mains

mpany Develops A

Solves the Problem

San Gabriel Valley stopping unit assembly is shown in the picture above being inspected by G. B. Forden, S.G.V. special clerk, who drew plans for the unit, and district manager A. E. Madden, who developed it with the assistance of Don Williams, San Gabriel Valley crew foreman.

While this was a big improvement over former methods, still gas escaped from the time the cap was removed until the plug could be introduced. The hazard was decreased but it wasn't entirely eliminated.

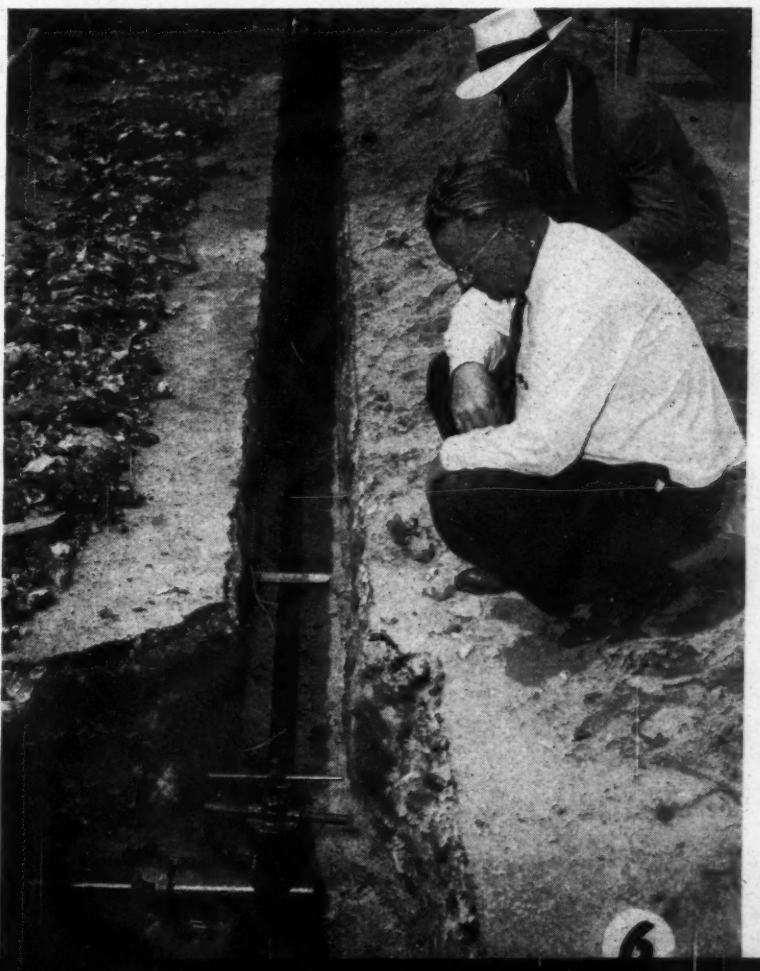
A. E. Madden, San Gabriel Valley district manager, and his co-workers pondered over the problem until finally they came up with the solution in the form of a fitting now known as the San Gabriel Valley stopping unit. Using this fitting, gas flow is stopped at the pressure control tee without the escape of any gas whatsoever. The whole operation is accomplished inside the sealed chamber of the unit.

The stopping unit has a vertical and a horizontal barrel. The barrels intersect at right angles like a street intersection and the two make up a single pressure-tight chamber. By a rather involved procedure of shutting off one barrel with a rubber plug while necessary changes are made within the other, the shutoff and turn-on operation progresses through its several stages without a dribble of escaping gas.

Don Williams, crew foreman, helped Madden in the initial development of the equipment. G. B. Forden, S.G.V. district special clerk, drew up the plans, which were then presented to the engineering department for approval. Fred Winslow and his boys at the general shop took over from there.

Experimental units were made up which were sent to all districts for trial and suggestions toward improvements. Finally the perfected fitting was evolved.

When the main extension has been connected the whole procedure is reversed. H. Keiser and K. Reafsnyder inspect a main shut off by the unit.



Expanding rubber plug is then introduced into vertical barrel nd seal top is screwed on. Horizontal plug is withdrawn from ne intersection and the vertical plug is pushed into position in the gas main, sealing it.

The MEASUREMENT of FLAME Radiating Characteristics

By J. P. VOLLRATH

Fig. 1. Measuring equipment in use.

CONSIDERABLE interest is being shown by fuel and research engineers in the measurement of flame radiating characteristics in high temperature melting and refining furnaces. This measurement, if properly analyzed, points the way to increased production, more efficient use of fuel and smoother working furnaces.

At the present time, this measurement is being used to improve the operation of high temperature furnaces such as the open hearth and glass melting tank.

The technique of making the necessary measurements has been progressively changed as additional experience was gained. Tests have now been made on many types of open hearth fuels and it is of considerable interest to note that by the use of suitable measuring apparatus, it was shown to be possible to improve flame character beyond what appeared by visual inspection to be "ideal."

Analysis of the Problem

Although the radiation in a hot furnace or from heating flames encompasses many wavelengths, the major portion of the energy is represented by waves ranging from 1 to 3 microns in length.

The distribution of energy in the various wavelengths at several furnace temperatures is illustrated by the curves in Fig. 2. The shaded area between 0.4 and 0.75 microns represents light waves which can be detected by the human eye (waves of 0.475 microns appear blue; 0.505 microns, green, and 0.70 microns, red). Other shaded portions in the figure indicate bands of wavelengths in which CO_2 and water vapor tend to radiate energy, if these gases are present in the flame. The amount of energy emitted by these gases is related to their concentration as well as the thickness of the layer of gas. (In theory, if a layer of cold gas containing CO_2 and water vapor lies in the sighting path of a radiating pyrometer, some of the radiant energy emitted by the target is absorbed by these gases. In practice, this effect is negligible because the gases are at or near flame temperature.)

In high temperature melting and refining furnaces heat is transferred to the bath partly by direct contact of portions of the flame and partly by radiation, the latter amounting to approximately 85 to 90% of the total heat transferred. It has been shown by investigators that it is the intensity of the radiant energy falling upon the bath that is of primary importance, regardless of the temperature of the flame from which it issues. The lower the concentration of hot particles of carbon within the flame, the higher the flame temperature must be for the emission of a given intensity of radiant energy.

Since the bath radiates energy in relation to its own temperature (modified by its own radiation power), the net heating effect of the flame depends upon the excess of the intensity of radiant energy falling upon the bath and absorbed by it, over that which it radiates. Thus, if the flame radiation were reduced until the bath radiation equals that absorbed by it, the net gain would be zero. As the intensity of radiant energy of the flame is increased above this value, the net gain to the bath increases at a rapid rate. Therefore, high intensity of flame radiation is especially important.

Summarizing, the intensity of radiant energy is dependent upon both the concentration and temperature of the hot particles of carbon as well as the CO_2 and water vapor present in the flame and it is this combined effect that we wish to measure.

Radiation Pyrometer Provides Solution

Since radiation pyrometers absorb the greater portion of wavelengths encompassed by heating flames and thus respond directly to radiation intensity rather than flame temperature, they are being used as a practical and

IN HIGH TEMPERATURE furnace operation, 85 to 90% of the heat is transferred to the load as radiant energy. It is thus highly important to be able to evaluate and measure the flame radiating characteristics of a high temperature furnace, to develop the most efficient and productive operation. As a result of considerable interest and experience in such measurements, it has been determined that judgment of flame characteristics from visual appearance cannot be depended upon, but instrumental techniques have been developed, employing adaptations of the radiation pyrometer, so that reliable measurements can now be made with relative simplicity. Such measurements are described and discussed in this article which first appeared in "Instrumentation" published by The Brown Instrument Co., Philadelphia. A. J. Fisher, fuel engineer at the Sparrows Point plant of Bethlehem Steel Co., has presented several technical papers in which the practicability of this measurement is clearly outlined. These papers have been published in the "Iron and Steel Engineer" and their review is recommended.—Editor

convenient method of evaluating this highly important characteristic.

Various lens materials are used for radiation pyrometers, depending upon the service to which they are applied. Any material either transmits, absorbs or reflects the radiant energy striking it and the percentages depend upon the composition of the material. For example (referring to Fig. 2), the pyrex lens of a high range radiamatic transmits all energy from 0.3 to 2.7 microns or about 73% of the total radiation intensity at 3400° F.

Since pyrex absorbs energy above 2.7 microns, practically all the wavelengths radiated by CO_2 and water vapor are eliminated.

The fused silica lens of an intermediate range radiamatic transmits energy with practically no absorption in the band of wavelengths from 0.3 to 3.8 microns, which include about 87% of the total radiant energy from a source at 3400° F. The CO_2 and water vapor radiating bands of greatest area are included. This design is recommended for flame character studies because experience has shown that radiation pyrometers equipped with these lenses have been found to co-ordinate excellently with furnace operation and do not present the delicate maintenance problems common with radiation pyrometers equipped with special lens materials or reflecting surfaces.

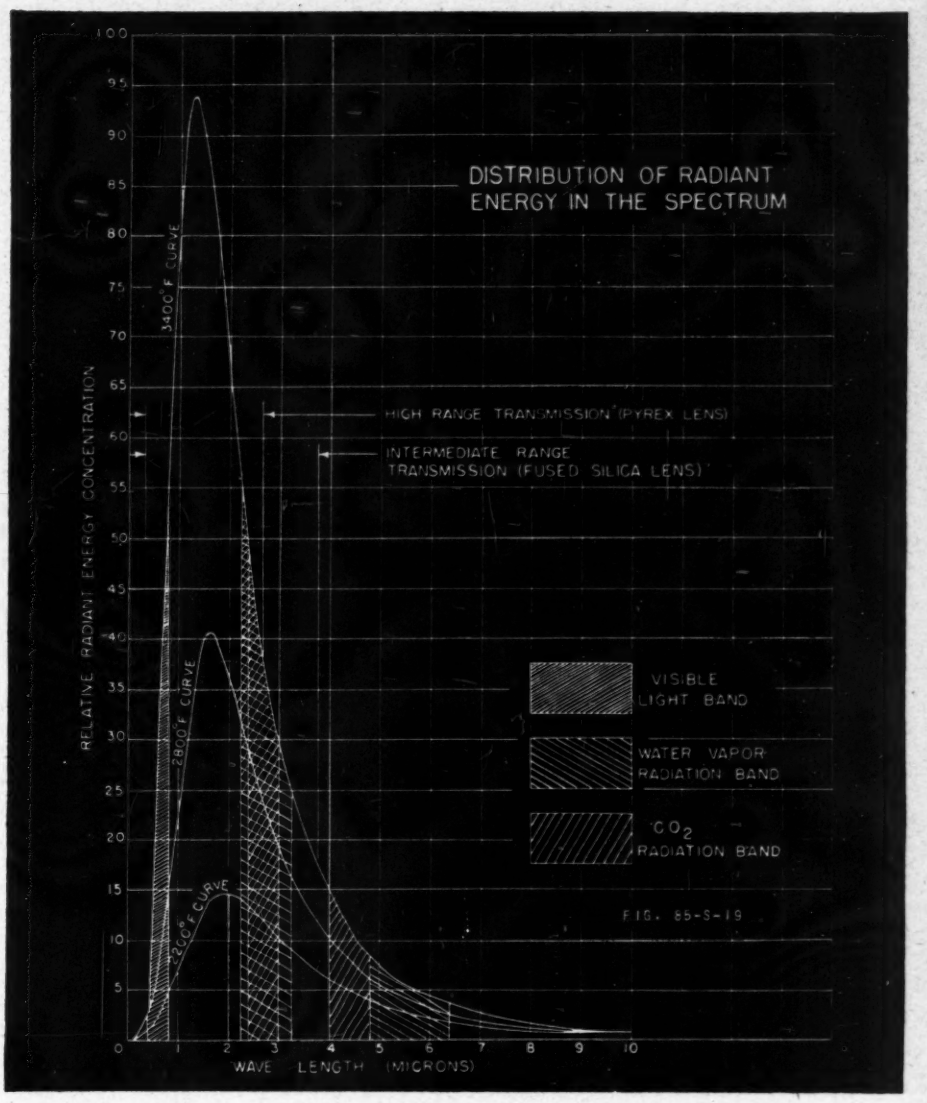


Fig. 2. Distribution of energy in the various wave lengths at several furnace temperatures.

Equipment

The Brown system of flame character measuring equipment consists of:

1. The Radiamatic and suitable accessories to adapt it to the application.
2. The ElectroniK recording instrument.

The Radiamatic is an industrial type radiation pyrometer having laboratory accuracy. For this service it is supplied with a fused silica lens and is known as the "intermediate range radiamatic." It has many operating features which combine to make it the ideal tool for this application. These features include:

1. *Ambient temperature compensation.* Eliminates serious errors caused by raising the temperature of the radiation pyrometer. When it is considered that measurements are made near furnace door openings, the importance of compensation cannot be over-emphasized.
2. *Suitable for all fuels.* Transmits a wide range of wavelengths of radiant energy. Hence, an excellent measure of furnace operation is provided.
3. *High Speed of Response.* Responds almost instantly to all changes in radiant energy, therefore shows every effect of any change in combustion conditions.
4. *May be Operated at High Ambient Temperatures.* The Radiamatic has been designed for continuous operation up to 250° F. It does not require water cooling and, therefore, it is a practical tool on the open hearth floor.
5. *Rugged Construction.* It is not damaged by the many abuses common to heavy industries.
6. *Interchangeable Calibration.* Brown Radiamatics are calibrated to standard values permitting complete interchangeability.

The Radiamatic is supplied with a finned cooling fitting and a flange to which an open end metal sighting tube is threaded. The sighting tube is supplied by the user and may be of wrought iron or heat resisting alloy. Where unusually high furnace pressures are carried, the sighting tube may be purged with compressed air so as to prevent possible damage to the Radiamatic.

The ElectroniK recording instrument with its high speed continuous balance operating principle is well suited to this application. It is immune to the effects of vibration, dust and high ambient temperatures and is therefore a practical instrument in the hands of operating personnel. The large indicating scale empirically calibrated 0-100 relative radiating power is easy to read at distances up to 70 ft. Thus, an eye can be kept on the instrument while making burner or other adjustments.

For this service, the instrument of special calibration is supplied with a high speed chart drive and an automatic control switch so arranged that the chart rotates only when the Radiamatic is sighted upon a hot object. When operating, the chart makes one complete revolution in 24 mins., equivalent to a lineal speed of approximately 1.25 in. per min. at 90%

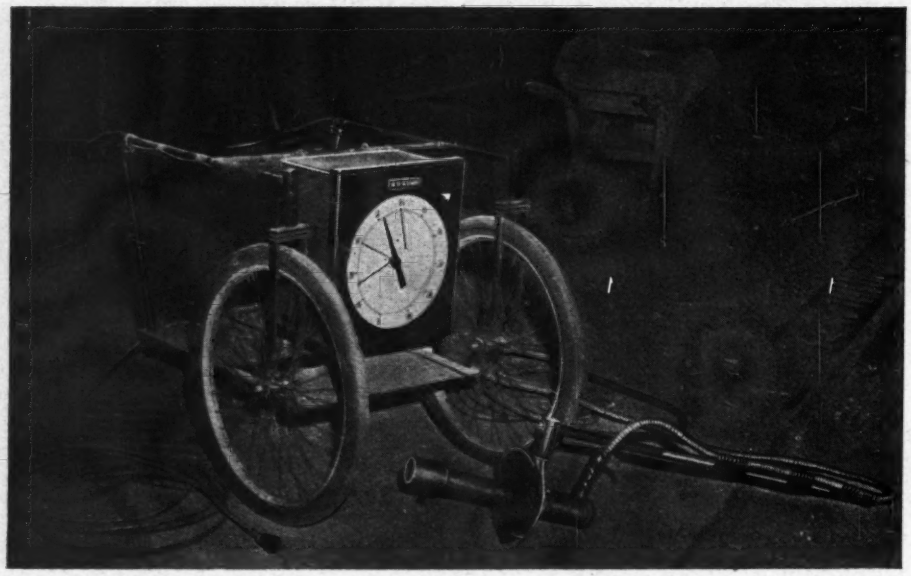


Fig. 3. Measuring equipment mounted on carriage for easy transportation to furnace or shop.

of instrument span. Thus, every part of the flame is clearly recorded without excessive usage of instrument charts.

Use of the Equipment

Some investigators sight the Radiamatic on a horizontal line through the door wickets and adjust burners to obtain maximum emission. Others measure a vertical or horizontal traverse of the flame to study its distribution in the furnace. Reference radiation measurements of the backwall and bath during reversals are also considered by some investigators.

In some cases the instrument is permanently mounted near the fuel reversing stand and is wired to several plug receptacles located between the furnaces. The Radiamatic is then connected through suitably protected flexible copper wire so that it can be used at any furnace door. Such an arrangement serves a number of furnaces. In other cases, the instrument has been mounted on a wheeled carriage so that it can be easily transported to any furnace or shop.

In using the equipment, it should be remembered that best radiation conditions exist in that part of the flame where the concentration and temperature of the carbon particles and radiating gases are highest. Theoretically, for maximum heating rate, these conditions should prevail over the largest possible area of the hearth, but in practice the conditions should prevail over the maximum permissible area consistent with good furnace operation, refractory practice and fuel economy. The overall radiating power of the flame depends upon many variables, among which the following predominate:

1. The letative radiating power of the flame in respect to its length and shape.
2. The relative radiating effect of the flame in respect to its position in the furnace.
3. The relative radiating power of the flame in respect to:
   - (a) Design Factors
     - (1) Fuels available
     - (2) Atomizing agents available
     - (3) Port design.
     - (4) Burner design.
     - (5) Furnace design.
   - (b) Operating Factors
     - (1) Volume, temperature and pressure of fuel (including composition where mixed fuels are used).
     - (2) Amount, temperature and pressure of atomizing agent.
     - (3) Preheat air temperature.
     - (4) Furnace pressure.
     - (5) Angle and location of burner (when adjustable).
     - (6) Humidity conditions.

Therefore, the objectives to be gained by investigating flame radiating characteristics may be classified as follows:

1. To secure operating data which will be of value to the engineer in designing furnaces and selecting burner equipment.
2. As an operating tool by the furnace operator for adjustment of existing equipment to secure maximum tonnage and higher fuel efficiency.

The measuring equipment just described is the simplest and most practical answer to the problem of measuring flame character. The instantaneous response of the Radiamatic and ElectroniK instrument provides more significant information under extremely severe service conditions than is possible with mechanically balanced (cyclic type) instruments.

The equipment has been designed specifically for this application and will therefore prove accurate and dependable information with surprisingly little maintenance.

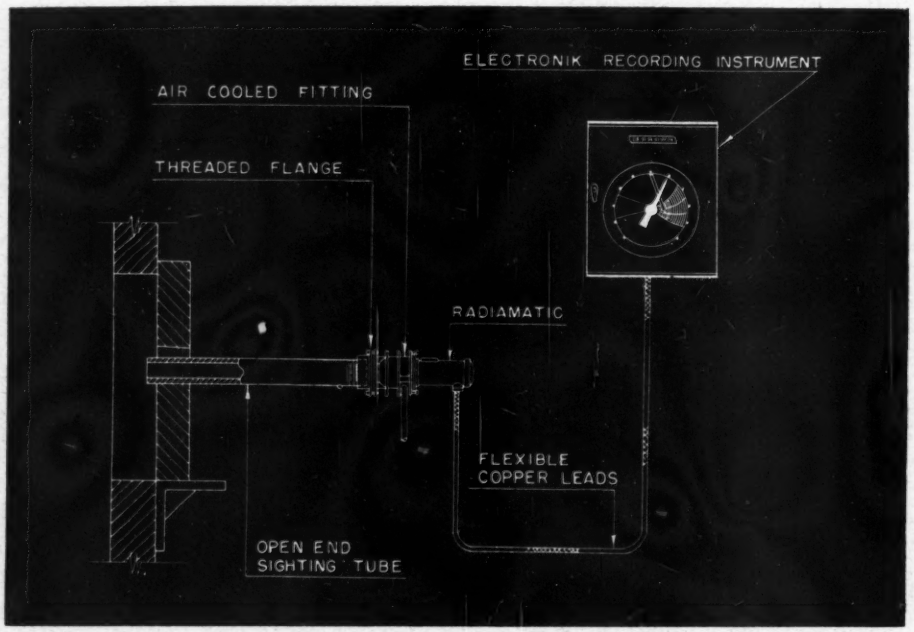


Fig. 4—Brown flame character measuring equipment.

TRAINING PROGRAM
for Gas Appliance Service Men

No. 7. Gas Refrigerator Servicing

By C. C. WESTMORELAND

TRAINING new appliance mechanics to service gas refrigerators is not, in general, more difficult than training new people to service other types of appliances. In fact, refrigerator servicing is easier to cover in some respects than other subjects—since but one manufacturer's product need be studied.

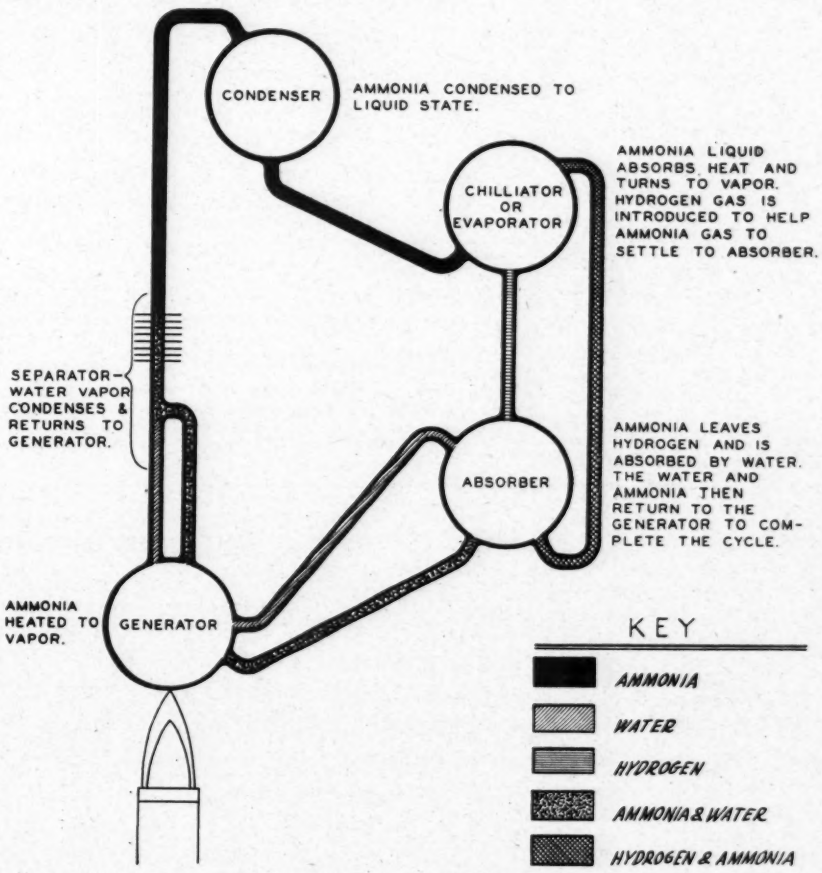
Continued improvements necessitating minor construction revisions have been made in the gas refrigerator, but frequent radical changes have not occurred to complicate servicing procedures. By comparison, the great variety in ranges and range accessories requires that considerable time be devoted to training in order to cover, even briefly, major variations in design, operation of controls, and other automatic features. In the gas refrigerator, the absence of moving parts and the long life of controls, burners, and other accessories, reduces the number of service problems involved and tends to simplify the service training procedure.

The mystery surrounding the apparent unorthodox phenomenum of freezing with heat is the first point that needs to be treated in order to remove apprehension in the minds of students when they approach instruc-

Simplified Refrigeration Cycle

When heat is applied to the generator, which is filled with a solution of ammonia and water, the ammonia is vaporized and forced upward into the separator together with a part of the water. The water and ammonia vapor is forced up into the separator through a small pump tube in the same manner that water is forced upward over the grounds of coffee in a percolator type coffee maker. From the separator the ammonia vapor rises to the condensor where heat is removed by the cooling medium of either air or water, and the vapor is returned to a liquid state. In its liquid form the ammonia now flows by gravity into the freezing unit or evaporator where it is vaporized once more. The vaporizing of the ammonia in the freezing unit absorbs the heat from the refrigerator to produce refrigeration. The ammonia has an affinity for hydrogen so that when the ammonia is vaporized it combines with hydrogren rising from the absorber. The vaporized ammonia then is carried from the freezing unit to the absorber in an atmosphere of hydrogen. Inasmuch as ammonia and hydrogen together are heavier than pure hydrogen, the cycle continues between the absorber and freezing unit.

The water previously left in the separator maintains a constant level between the pump tube of the separator and the water inlet of the absorber where it picks up the ammonia brought there by the hydrogen from the freezing unit.


CONDENSER
AMMONIA CONDENSED TO LIQUID STATE.
CHILLIATOR OR EVAPORATOR
AMMONIA LIQUID ABSORBS HEAT AND TURNS TO VAPOR. HYDROGEN GAS IS INTRODUCED TO HELP AMMONIA GAS TO SETTLE TO ABSORBER.
SEPARATOR—WATER VAPOR CONDENSES & RETURNS TO GENERATOR.
ABSORBER
AMMONIA LEAVES HYDROGEN AND IS ABSORBED BY WATER. THE WATER AND AMMONIA THEN RETURN TO THE GENERATOR TO COMPLETE THE CYCLE.
AMMONIA HEATED TO VAPOR.
GENERATOR
KEY
AMMONIA
WATER
HYDROGEN
AMMONIA & WATER
HYDROGEN & AMMONIA

Since ammonia has a greater affinity for water than it has for hydrogen, the ammonia leaves the hydrogen and goes to the water when the three are brought together in the absorber. The water and ammonia then flow by gravity to the generator, completing the cycle.

Fig. 1. Schematic diagram of Electrolux refrigeration cycle.

JOB BREAK DOWN SHEET FOR TRAINING MAN ON JOB

Part: Electrolux Refrigerator

Operation: Service procedure in conjunction with turn-ons, new occupant closes, and P.M.C. orders.

Important Steps in the Operation Step: A logical segment of the operation when something happens to ADVANCE the work	Key Points Key point: Anything in a step that might Make or break the job Injure the worker Make the work easier to do, i.e., "knack," "trick," special timing, bit of special information
Initial Trip	
1. Close plug valve.	
Light-Up Trip	
1. Turn on water and determine that water is flowing on water-cooled models.	
2. Purge.	2. a. At lighter adjustment b. Purge completed when odor of gas is detected or when decided change of sound is noted.
3. Test Klixon.	3. Place lighted match at burner. If gas is present, issue 1773 for S#1 to change burner.
4. Light burner.	4. a. Hold lighted match to end of lighter tube. b. Press button. c. Play the flame on both the Klixon disk and the end of the burner. d. Release the button when the burner lights and an audible click is heard.
5. Observe that flame "draws" into the generator.	5. a. Let the generator heat up while lighting other appliances or draw the flame into the generator by blowing through a metal tube placed at the side of the flame. b. If draft will not pull flame into the generator, close gas supply to the refrigerator and issue a 1773.
6. Inspect maximum flame characteristics and adjust air when needed.	
7. Test minimum flame. a. Adjust as needed.	7. By noise, blowing, etc.
8. Contact customer.	8. Acknowledge work performed, and instruct customer on defrosting methods, if the customer is not familiar with that procedure.

Fig. 2

tion on gas refrigerator servicing.

Servel, Inc., evidently recognized the need for this type of instruction by pubishing the pamphlet "The Miracle of Ice from Heat". This pamphlet is well organized and clearly demonstrates the principles utilized. Its use should not be overlooked as a means of describing the physical principles involved in the operation of the refrigeration cycle.

Fig. 1 was developed as a means of supplementing the introductory material taken from Servel, Inc., publications. The drawing, which is purely schematic, has been useful in summarizing the general operation of the unit.

It has been found advisable to schedule instruction on this subject at a fairly early stage in training. At one time, refrigerator servicing was placed at the end of the training period so that the classroom instruction would be fresh in the minds of students when they went into the field. The advantages of that routine were offset by students' continued concern about the much dreaded final subject. When the sequence was changed to give refrigerator servicing earlier treatment, the students' confidence in their ability showed marked improvement. Such an arrangement also has the advantage of allowing men to review the subject while they are still in training and raise questions which may come to their minds after formal instruction has been completed.

In common with other precision equipment, gas refrigerators must be properly installed and adjusted to rather close tolerances for best performance. Since the serviceman has little control over the installation of a refrigerator, that problem need not be treated at length here. It will suffice to say that it has become profitable for utilities distributing gas refrigerators to police closely the installations on their lines as one means of reducing service calls. Adjustments of orifice sizes, gas pressures, thermostats and water controls are decidedly within the serviceman's scope of duties and need emphasis in training. Briefly stated, then, gas refrigerator service training is characterized by two points.

1. **The scope of training is relatively narrow due to standardization of models and simplicity of operation.**
2. **The need for precise and accurate adjustments makes it advisable for instructions to contain clear-cut step-by-step routines including specific recommendations to be followed when servicing gas refrigerators.**

Use of Cut-a-way Unit

The next step is to relate the general principles discussed on the schematic chart to a cut-a-way unit which has been painted to correspond with the unit diagrams published by Servel. The instruction involving the use of the cut-a-way unit is intended to give the student an understanding of how the various parts described in the schematic drawing fulfill their functions in the operation of the actual unit. This phase of training fills a definite need in that it removes the mystery from the operation of the cycle and can be used by appliance mechanics in analyzing obscure service problems.

In some cases, however, undue emphasis has been placed on the knowledge of unit operation. Much of the early training on gas refrigerator servicing was planned on the basis that a detailed and intimate knowledge of the refrigeration cycle was essential before a serviceman could effectively service gas refrigerators.

Recent experiences of service groups have slightly tempered that viewpoint. It was found that servicemen who were competent to service gas refrigerators did not remember the details of the cycle from year to year, but their effectiveness in servicing procedures did not seem to be affected. Apparently, these men had learned from experience that when a given set

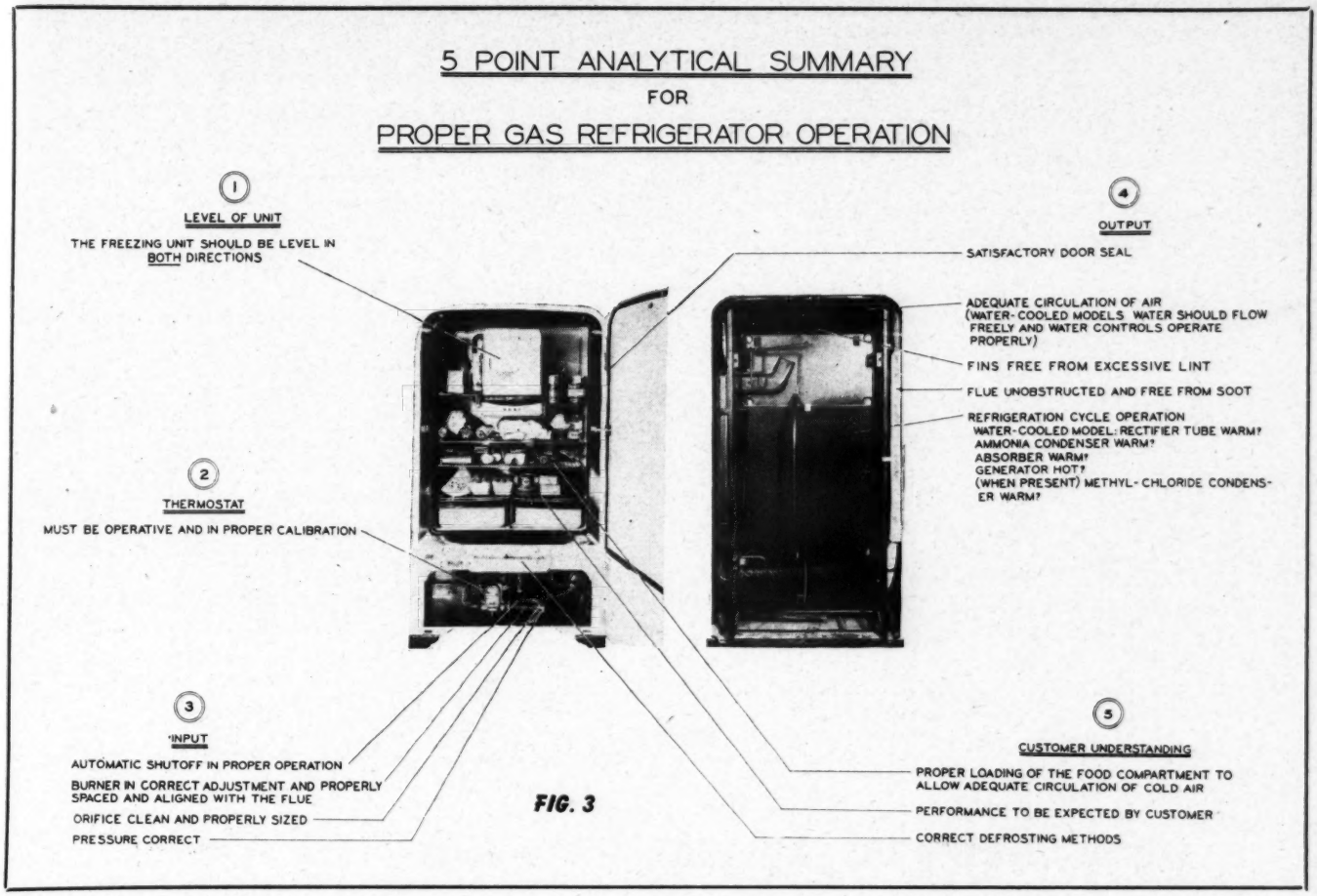

5 POINT ANALYTICAL SUMMARY
FOR
PROPER GAS REFRIGERATOR OPERATION
1
LEVEL OF UNIT
THE FREEZING UNIT SHOULD BE LEVEL IN BOTH DIRECTIONS
2
THERMOSTAT
MUST BE OPERATIVE AND IN PROPER CALIBRATION
3
INPUT
AUTOMATIC SHUTOFF IN PROPER OPERATION
BURNER IN CORRECT ADJUSTMENT AND PROPERLY SPACED AND ALIGNED WITH THE FLUE
ORIFICE CLEAN AND PROPERLY SIZED
PRESSURE CORRECT
4
OUTPUT
SATISFACTORY DOOR SEAL
ADEQUATE CIRCULATION OF AIR (WATER-COOLED MODELS WATER SHOULD FLOW FREELY AND WATER CONTROLS OPERATE PROPERLY)
FINS FREE FROM EXCESSIVE LINT
FLUE UNOBSTRUCTED AND FREE FROM SOOT
REFRIGERATION CYCLE OPERATION
WATER-COOLED MODEL: RECTIFIER TUBE WARM?
AMMONIA CONDENSER WARM?
ABSORBER WARM?
GENERATOR HOT?
(WHEN PRESENT) METHYL-CHLORIDE CONDENSER WARM?
5
CUSTOMER UNDERSTANDING
PROPER LOADING OF THE FOOD COMPARTMENT TO ALLOW ADEQUATE CIRCULATION OF COLD AIR
PERFORMANCE TO BE EXPECTED BY CUSTOMER
CORRECT DEFROSTING METHODS

FIG. 3

of abnormal conditions are found, definite counter measures will correct the trouble. This situation led to the belief that most service routines could be reduced to definite steps of inspection, which do not require an intimate knowledge of the physical and chemical changes involved.

Again the manufacturer seems to have anticipated that point, by furnishing the operation analysis chart contained in the Maintenance Manual which assists servicemen in determining what corrective measures should be taken to overcome specific service problems. Instruction on the various operations recommended on the chart, with appropriate variations to conform with local conditions, can be used as the basis for the organization of a large portion of the course.

Most routine servicing can be reduced to very well-defined steps which will assure reasonably complete coverage of the adjustment points on the refrigerator. The job breakdown sheet shown in Fig. 2 outlines the points considered necessary for conducting a normal inspection of a refrigerator when it is serviced in conjunction with a Turn-On or Periodic Meter Change Order.

Inspection routines on refrigerator complaint orders are more difficult to crystallize into definite routines, because of the varying types of service requested. In those instances, a broader knowledge of the operation of a gas refrigerator is necessary, but even that type of call can be organized into

THIS IS THE LAST in a series of articles by Mr. Westmoreland based on the experience of one large utility in adapting the Job Instruction Training program (J. I. T.) developed during the war to the training of appliance mechanics. The series offered specific examples of training techniques and methods used in developing a plan which integrates classroom lectures, slides, drawings, demonstrations, and manipulations by students with planned field experience to achieve the objectives of (1) a shortened training period and (2) more uniform instruction of new employees resulting in greater uniformity of operating procedures.

A Summary of the series with references follows:

1. A SUGGESTED PLAN FOR THE SMALLER GAS COMPANY (July, 1945)
Employee training, essential in preparing most new employees for their jobs, should be organized and controlled and not left to chance development. Such a program need not be elaborate to be effective and is not necessarily limited to large utilities, but can be tailored to fit the needs and financial limitations of smaller companies.

2. ORIENTATION (Aug. 1945)
Introducing the serviceman to the gas industry, his company and its customers. Background knowledge that will give him confidence in acting as the company's representative in his contacts with the customer.

3. METERS, REGULATORS, AND RELATED PIPE FITTINGS (Sept., 1945)
Tools and fittings—Pressure problems—Basic principles involved in the gas pressure regulator—Gas meters—Manipulation problems—Company policy—Safety—Job break-down sheets related to meter set work.

4. GENERAL PRINCIPLES OF GAS UTILIZATION (Oct., 1945)
General information that will help the serviceman solve unusual problems not specifically covered in training. Gas properties—Combustion — Burner design — Heat transfer—Automatic controls.

5. RANGE SERVICING (Nov., 1945)
Importance of range servicing—Sources of lecture material relating to ranges—Organization of lecture material — The development of work routines—Brush-up training—Oven heat control, calibration procedure.

6. WATER HEATER AND SPACE HEATER SERVICING (Dec., 1945)
Manipulation boards as substitutes for actual appliances—Sources of lecture information — Simplified wiring diagrams as a means of explaining forced air unit controls—The use of exploded drawings in gas appliance service training.

SERVEL ELECTROLUX DATA

(For 1120 Btu, 0.65 Sp. Gravity Natural Gas)

FIXED ORIFICE SIZES

Air Cooled Models

Cabinet Model Number	*Drill Size*			
	Using Flue Baffle		*Not Using Flue Baffle*	
	8" WC	*5" WC*	*8" WC*	*5" WC*
1942				
N-500, N-500A, N-500B N-650A	73	71	....	....
N-600	72	70	....	....
N-800, N-800A	71	68	....	....
N-1100	68	65	....	....
1941				
M-400	74	71	....	....
M-300, M-500, M-500A M-500B, M-650A	73	71	....	....
M-600	72	70	....	....
M-800, M-800A	71	68	....	....
M-1100	68	65	....	....
1940				
L-400	74	71	....	....
L-300, L-500A, L-500 L-600A, L-600	73	71	....	....
L-800A, L-800	72	70	....	....
L-1100	68	65	....	....

Fig. 4

general inspection requirements. Fig. 3 is an example of the general conditions which should be checked when unit operation is questioned.

Company procedures and policies should be related to the instruction material pointing out spceific service routines which are recommended by the particular utility. Varying gas pressures and Btu. values of the gas served are examples of items which require specific treatment. Information such as gas pressure, orifice sizes, and replacement parts for various models is necessary for reference purposes by servicemen in the field.

It has been found that data of this nature is most useful when prepared on small sheets which can be carried in the serviceman's book together with his orders and is therefore readily available for reference. Fig. 4 is an example of one arrangement which has proven helpful to appliance mechanics for reference.

Snow Removal System Uses Gas-Fired Boiler

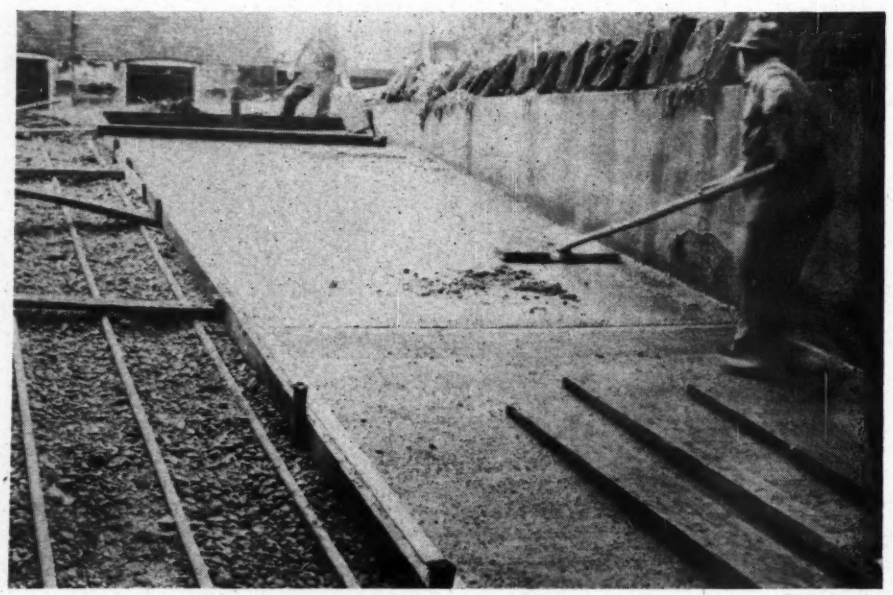
AN A. M. Byers Co. underground snow-melting system consisting of wrought iron pipe coils embedded in the driveway concrete and supplied with hot water from a gas-fired boiler has been installed by Dr. Ralph G. Fabian, a Pittsburgh physician.

Byers engineering experiences revealed that about 100 Btu per hr. per sq. ft. of surface is the heat output required to melt 1 in. of snow per sq. ft. per hr. Dr. Fabian's gas boiler supplies 175,000 Btu per hr. and the driveway surface is 750 sq. ft.

The heating element, in the shape of a grid, is composed of two 2-in. header pipes and 12 lengths of 1¼-in. grid pipes running between them. The grid rests on a 4-in. crushed rock fill and is covered by a 4-in. concrete slab. A 2-in. supply main runs from the boiler in the garage to the front lawn adjacent to the driveway. To prevent heat loss, the mains are enclosed in an insulated tile conduit. Anti-freeze is used to protect the system to a temperature of —10° F.

To operate the system, the circulator pump on the return line is activated (manually or automatically) and cold water drawn from the grid into the boiler coils flows through an aquastat regulating the gas flame. The boiler pilot may be allowed to burn during the cold season, maintaining a constant low temperature, or the boiler may be started for each operating period.

The oldest known specifically designed snow-removal system was installed by a public utility in 1925 under sidewalks on two sides of the building. Managers of commercial establishments, airports and private businesses envision in such systems a quick, economical means of removing snow. Engineering investigations into the potentialities of snow-removal systems for airport runways or taxi strips indicate that the initial investment for installation would be approximately 30¢ per sq. ft.



Half of the 4" concrete slab has been poured over the wrought iron pipe grid for the snow-melting system in Dr. Fabian's driveway.

NEW DEVELOPMENTS

In Gas Pressure Regulation

By KENNETH R. D. WOLFE
Fisher Governor Co., Marshalltown, Iowa*

AUTOMATIC pressure regulation in the gas industry will certainly benefit from some of the new products produced during the war. It is difficult to say at this time exactly what new developments will be most helpful because all the manufacturers of gas regulators have been completely occupied by war work. Few new developments are beyond the experimental stage.

One product that we do know, however, which will be vastly improved is synthetic compositions, from which valve discs and diaphragm sheets are made. In the pre-war days we had natural rubber compounds and a few synthetics such as Neoprene, Resistoflex, Thickol and a few others. Some of these had good characteristics, and some were very poor in contact with certain gases. For instance, Neoprene served quite well in natural gas service and with certain other hydrocarbon gases, but in contact with most manufactured gases it deteriorated rapidly.

With the hundreds of different composition compounds that have been produced during the war, there is no question but what a satisfactory rubber-like material will be found for nearly all gas applications. A great deal of research is now being conducted by various rubber manufacturers and regulator manufacturers to perfect special valve disc and diaphragm compositions for all gas industry applications.

New valve stem packing and stem lubrication is also getting the attention of various manufacturers. These developments will be especially helpful to gas companies operating a number of old regulators where packing and lubrication is still a problem.

Future Prospects

We have had excellent metals for regulator bodies and the pre-war years saw the introduction of many stainless steels and hardened steels for valve seats and inner valves, but the war has caused the greatest study in metallurgical science that industry has ever known. National security has kept many of these improvements from coming into general industrial use, but most of these will be released for industry in the immediate post-war period. These will undoubtedly result in regulators giving better control, longer life of parts, with lower maintenance costs.

In this connection, it is interesting to note that the U. S. Army occupying that part of Germany which we are to control has announced that it has discovered several German secret alloy metals superior to anything known in this country today. You can be sure that these discoveries, as spoils of war, will benefit this industry's regulators in the future.

Perhaps the greatest overall and immediate benefit the regulator industry can pass onto the gas industry is the improvement in precision machining and better planning of production. Virtually every regulator manufacturer has been called upon to supply equipment either of their own type or of special design, directly for the war program.

In preparing this discussion, the principal regulator manufacturers were invited to contribute information on their new developments. Some of the manufacturers not in a position to make announcements on new products, promised that there would be improvements available during the first year of peacetime operation.

Pittsburgh Equitable Meter Co. has introduced a new line of Emco pilot loading units to enable sensitized direct operated balanced valve regulators. There are three assemblies, the pilot loading duplex control, the pilot loading system with an auxiliary sprint control, and the pilot loading system with auxiliary lever and weight control. All three of these pilot systems offer a means for improving and modernizing the old regulators now installed, by providing both an over and under pressure protection for the outlet line.

The Chaplin-Fulton Manufacturing Co. also has introduced an improved pilot loading system for their high and low pressure regulators. This system is known as "Sensitrol" and can be supplied on new regulators or applied to existing regulators that are not giving the sensitivity required for modern distribution systems.

Fisher Governor Co. will shortly announce a complete new soft seat regulator body and a new self-contained pilot operated regulator for low and medium pressure industrial and field service. Improvements in the Fisher-King Booster for pressure boosting high pressure lines and the Fisher Time-Temperature Booster for low pressure systems have been announced or will soon be released.

One Fisher development during the war was the improvement of the Wizard pilot operated regulator, which is used on high pressure gas control, such as town border stations, compressor stations, and industrial applications. This addition to the Wizard pilot unit is a throttling range adjustment which gives the gas industry a simple, dependable and highly flexible pilot valve that permits adjustment to eliminate hunting, pulsation, and other common gas regulator troubles.

The Fisher Research and Experimental Laboratory is now completing a new line of single seated regulators for high pressure reduction and small flow conditions. This problem where erosion of parts has been severe, has always been a troublesome one.

Summary

Summing up the new developments in the regulator field, we can say that the manufacturers have responded to demands of the gas industry for more sensitive and dependable control equipment. Gas operators have been slow to recognize the advantages of pilot control and pilot loading, but with the advent of extremely heavy gas demands from war industry and war housing, many gas distribution operators have found that regulating equipment which they have always considered adequate would not perform satisfactorily under severe load.

It is urged that the gas operators give more thought and consideration to these new types of controls and to the betterment of their distribution systems by adopting and trying out these devices that have been produced especially for the gas man's problems. The idea that a pressure regulator is still good after 25 years, just because it still works like it used to, should be forgotten. Rather, the operator should be on the lookout and alert for better regulators which will result first in better customer service, second in lower average distribution pressures, and last, lower gas leakage and "unaccounted for"; and once a new regulator that will give better results is found, it should be installed, regardless of the age or condition of the original regulator. One of the expensive fallacies of the gas industry has been the keeping and maintaining of inefficient and obsolete pressure regulating control devices.

*Presented at the Mid-West Gas Conference & School, Mid-West Gas Ass'n & Engineering Extension Service, Iowe State College, Ames, Iowa, Oct. 1945.

A great advertising Gas Refrigeration to

. . . FEATURES THE EXPERIENCE OF SCREEN AND RADIO CELEBRITIES

"Take my advice and pick a Servel . . . it's so-o-o silent,"
says Jerry Colonna famous radio and picture star
"Good-bye, noise and trouble! We're changing to a Servel!"
says Jane Wyman
"We tell friends to choose Servel . . . It's always silent!"
says Fred MacMurray
Stays silent . . . lasts longer
Servel
GAS REFRIGERATOR

Caloric Stove Adds To Plant Facilities

Julius Klein, general sales director, Caloric Gas Stove Works, Philadelphia, announced that a large addition to the firm's plant at Topton, Pa., is being erected. It will add 90,000 sq. ft. for manufacturing facilities. The Topton plant and other property there covers 130 acres. The plant addition is scheduled to be completed in the spring of this year. Klein stated that production this year will be increased about 200% by 1947. Caloric has 19 factory warehouses, a chain extending to all sections of the United States.

In highlighting some of the latest improvements in the Caloric gas range, Nathan Klein, general manager, told of the improved and patented oven door hinge and spring assembly, and of a patented broiler drawer which, through an ingenious trigger arrangement, slides out in one piece for easy cleaning. He described many other conveniences, which will greatly improve the performance of the ranges.

Frederick T. Ketchum, Caloric sales manager, outlined new methods of handling quotas. He said a new record-keeping system has been installed in the executive offices. Sales of the Caloric Luxury Line of gas ranges are being supported by national advertising and promotion. The campaign includes advertising in most of the principal magazines for women, in farm journals and many publications in small towns and cities. Caloric also has prepared a sales manual and a sales training program to assist retailers in selling the complete line.

Long Island Lighting Co. To Erect Office Building

In keeping with its policy of establishing its own buildings in progressive communities, the Long Island Lighting Co. proposes to erect its own commercial office building to serve customers in East Hampton and the surrounding area. Actual construction will start when materials and equipment are available, and the building should be ready for opening this summer.

St. Petersburg, Florida Increases Storage Capacity

Storage capacity of the city gas plant at St. Petersburg, Fla., will be tripled and production stepped up by a $700,000 construction program now under way but not to be completed until spring. City Manager Sharpe requested a 10% curtailment in gas use until the project's completion, to prevent loss of pressure.

Mid-Continent Gas Supply Surveyed by Geologist

"The widespread network of gathering and distribution lines throughout Oklahoma and reaching into adjacent states of Texas, Louisiana and Kansas, can supply natural gas for as long as any industry cares to look ahead," declared Hugh D. Miser, chief of the fuel section of the U.S. Geological Survey, Washington, D.C., in a recent address before the Oklahoma Mineral Industries conference at Ada. Miser quoted figures to show that these states have 82.58% of the known natural gas reserves of the United States. The total gas production in Oklahoma, according to the U.S. Bureau of Mines Mineral Yearbook for 1943, was 297,771 MMcf, with gas wells producing 54% and oil wells 46%.

Panhandle Eastern Gets 57,000 Acres Texas Leases

Shamrock Oil and Gas Corp., Amarillo, Texas, has transferred 57,000 acres of Texas Panhandle gas leases to Panhandle Eastern Pipe Line Co., according to Shamrock officials. Both sweet gas and sour gas, the sour gas after desulphurization, will be delivered to a Panhandle Eastern line terminal starting June 1 at the rate of 30 MMcf daily. This amount is to be increased within 10 years to 60 MMcf.

New Freedom Gas Kitchen Featured as Contest Prize

A New Freedom Gas Kitchen is to be supplied by Servel, Inc., Evansville, Ind., as part of the prize in a contest sponsored by Glamour magazine for American working girls. The two first prize winners will each receive a private living suite built by Glamour in her family's home at a cost of more than $10,000 each in construction, furnishings and equipment.

Brooklyn Union Sales Highest Since 1941

During 1945, despite shortages and wartime controls, 7129 appliances costing $1,065,814 were delivered to customers. The dollar sales were the best since 1941. Included among the appliances delivered were 1852 water heaters, 1796 ranges, 1199 house heaters, 1007 refrigerators, 281 space heaters and 994 industrial appliances.

Kentucky Gas Distributing To Buy Lebanon Franchise

The Lebanon, Ky., city council has approved sale of a franchise providing piping of natural gas into Lebanon. The sale was requested by the Kentucky Gas Distributing Co. The company proposes to tap the 24-in. Tennessee Gas and Transmission Co. line and to supply fuel for seven towns in addition to Lebanon.

IOCC issues Newsletter

As an expansion of its public relations activities the Interstate Oil Compact Commission distributed from its headquarters in Oklahoma City a trial issue of a proposed monthly newsletter.

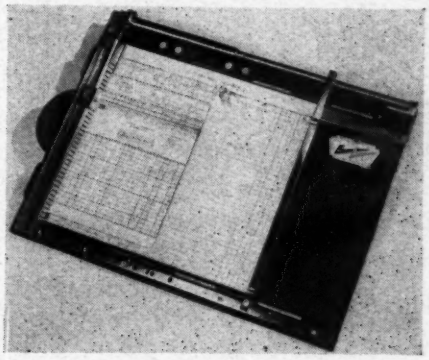
The issue bore the date of Jan. 1, 1946 and was called "Compact Comment".

Convair to Make Ranges

Consolidated Vultee Aircraft Corp. is the first of the large aircraft plants to enter the home appliance field, according to a recent announcement. The company is converting its Nashville, Tenn., plant to the production of gas and electric stoves.

Remington Rand Develops New Accounting Method

Multi-Matic accounting, a new system of accounting and payroll preparation, has been developed by the Systems Division of Remington Rand Inc. It is



applicable to small and medium size businesses and to branch office accounting in large organizations. It has been pre-tested by selected companies and has proved practical and economical, according to Remington Rand. Users report savings of 40% in cost and up to 66% in time compared to conventional bookkeeping methods.

The method was conceived and invented by Rolf Hurup, widely known in Europe and America. It was devised for the purposes of making more complete and useful financial and statistical reports available to managements of medium and small businesses; reducing the cost of the bookkeeping operations; and increasing the accuracy of reports prepared manually. The basic principle is the simultaneous posting of a number of financial or statistical reports by means of a single writing. The patented accounting board permits the same entry to appear in a number of different columns on separate reports.

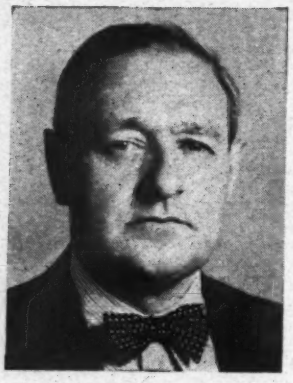
Information regarding Multi-Matic accounting is available through any branch office of Remington Rand Inc., Systems Division, or from the Systems Division, 315 Fourth Ave., New York 10, N.Y.

Hearing Held on Gas

A hearing concerning the wastage of natural gas in Mississippi was held in Jackson Jan. 4, according to H. M. Morse, director of the state oil and gas board. The board appointed a committee to ascertain what use is being made of natural gas in the state. No figures are available at present as to just what use is made of a large portion of the gas produced. Indications are that a large part of it is being wasted.

Louisiana System for Sale

The Reconstruction Finance Corp. has announced that the Lake Charles, La., natural gas system, now operated by Union Sulphur Co., is for sale or lease. The system has about 97 miles of pipe line and supplies major industrial plants in the Lake Charles area. The transmission capacity is approximately 127 MMcf daily and there are undeveloped gas reserves within easy connection distance.



PROMOTIONAL NOTES and NOTIONS

By STANLEY JENKS

By-products

Admitting that there has been a considerable advance in the marketing of by-products since the days when I used to argue with our production superintendent about a fair residual credit for coke, I know most manufactured gas men will agree with an English gas man who recently, in a letter to the British *Gas Journal*, wrote: "There are latent powers within the Gas Industry awaiting development."

It is no new thought on this page or within the American gas industry that our ability to reduce the cost of manufacturing gas is to a great extent governed by the success of our chemists in increasing marketable by-products for us.

Our British gas correspondent in his letter points out the remarkable success he enjoyed in his victory garden using crude ammoniacal liquor as a fertilizer. He divided his garden in half, thoroughly spraying one-half only with crude ammoniacal liquor in the autumn. The following spring, he planted both halves equally, planting each variety on the same day to even out the chances. The sprayed half produced 20% better crops, and the experimenter justifiably gives full credit to the crude ammoniacal liquor from the gas works. He concludes that its good will be cumulative in the soil both as a fertilizer and an insecticide.

Being no farmer or gardener—I could never learn the right end up to plant seeds—I can only advance the idea as a possible commercial outlet for a by-product that has no value today.

The Dope

Believe it or not, there are still people around the gas industry who do not believe in advertising. At least, there is one such individual, for I was talking to him only a few days ago.

We were discussing the December report of the A.G.A. Committee on National Advertising. It lists, you remember, competitive national advertising expenditures for the first 10 months of 1945. Excluding those advertisements featuring more than one appliance, the gas range manufacturers spent $330,345 against their electric competitors' $370,817.

The gas lad with whom I was talking shared none of my glee that our manufacturers were almost matching dollars with the kilowatt-cookery boys in national advertising. He thought it was a terrible waste of money, in that gas ranges, he said, were outselling electric ranges 7 to 1 nationally.

His remarkable conclusion was that the manufacturers should spend less on such advertising and reflect the reduction in their prices, or put it up as prizes for *utility* salesmen.

Yes Sir! Not all chisellers are stonemasons, nor do all the blind have seeing-eye dogs.

More Appliances

One of the most encouraging signs of the times for the gas industry is the way appliance manufacturers are betting on its future.

Electrical and oil range and water heater manufacturers are announcing, or have already introduced, gas ranges and water heaters. Old, established gas appliance manufacturers of special equipment are broadening their fields, and even manufacturers previously outside the domestic appliance field are producing gas appliances and equipment.

Since any worth-while manufacturer neither asks nor needs special favors and is perfectly willing to earn his position in the market with quality, service, and sales effort, it is to be hoped that gas utilities themselves will be broad-gauged enough in their merchandising policies to cash in on the situation.

Unfortunately, there are still some gas utility managements which apparently have not recognized or, worse still, are not prepared to accept the simple fact that every quality gas appliance sold is directly or indirectly a load-builder. Even the more efficient modern appliance replacing an obsolete model is actually a load-builder, because it insures a continuity of gas usage otherwise jeopardized by appliances designed for other fuels.

The days when a utility, through discriminatory appliance sales policies, can control or even gobble up the volume of gas appliances sold in its territory ought to be gone forever.

Promotional effort should be the sum of that of the utility plus that of every quality appliance manufacturer or his distributor who is willing and able to sell appliances in the territory served by the utility.

As I said before, the manufacturers are betting on the gas industry to provide the gas service. The gas industry's best bet is to help every responsible gas appliance manufacturer go to town in his territory.

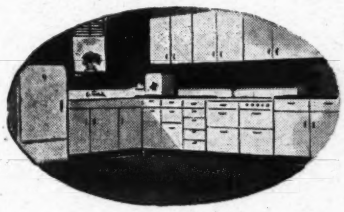
TO MATCH THE HOMES OF TODAY

SMITHway Permaglas

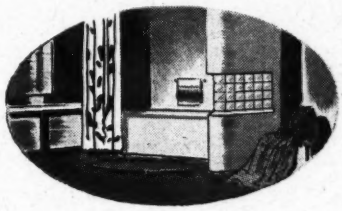
GLASS-FUSED-TO-STEEL

TRADE MARK REG. U. S. PAT. OFF.

GAS WATER HEATERS

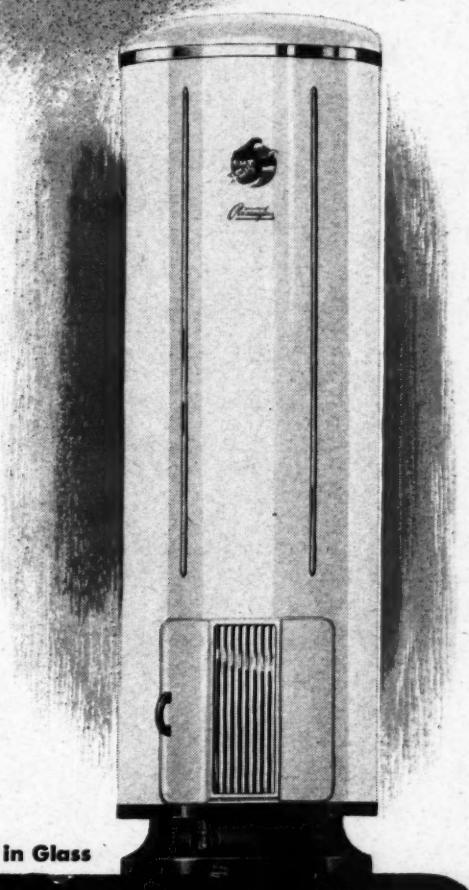


To match the gleaming efficiency, the modern conveniences of today's New Freedom kitchens . . .



To complement the beauty, comfort and convenience of today's modern bathrooms . . .

SMITHway Permaglas Water Heaters deliver hot water as sparkling clean as the source itself!



There's Only ONE Permaglas

For the thousands of new homes now being built . . . for every present home that will be improved and modernized . . . here is the *one* water heater that meets in every way the new demand for greater convenience, better performance, longer-lasting service.

SMITHway Water Heaters, lined with *Permaglas*—the sparkling blue, mirror-smooth glass-fused-to-steel—resist tank rust and corrosion under *any* water conditions. *Permaglas* CANNOT rust or corrode!

Send today for "The Inside Story of Permaglas." Find out now the facts on—

Permaglas . . . a Great Aid to Sales

With SMITHway *Permaglas* Water Heaters you have the most powerful *new* sales story in the gas-appliance business . . .

The monoquad, glass-lined heater tank. Sparkling clean as a drinking glass. No "tank-corrosion" in the bath . . . no "tank spots" on clean laundry. Hot water as pure as the source itself!

Plus 7 other great features that challenge all comparison.

Heated with Gas . . . Stored in Glass

SMITHway Permaglas WATER HEATERS

A. O. SMITH Corporation

ASSOCIATIONS

A.G.A. Endorses Book on Gas Analysis and Testing

"Gas Analysis & Testing of Gaseous Materials" by V. J. Altieri, chief chemist, Eastern Gas and Fuel Associates, Boston, is a new book of standards for sampling, analyzing and testing gases and gas mixtures containing varying amounts of liquids and solid dispersoids.

A few of the many subjects covered are kinds of materials, processes, local factors, purposes of work, properties and composition of gases, measurement of quantity and flow, selection of methods of sampling, instrumentation and process control, appartus and reagents, common operations, general calculations, specific tests and facilities showing usefulness of analysis and testing of materials and processes in the gas phase.

The volume is an ideal textbook which presents methods and techniques obtained from unpublished manuals prepared by Altieri and M. C. Cryan during the past 18 years to assist undergraduate chemists, engineers and other students. It is useful for training courses in industry, technical schools and colleges.

The book is endorsed by the Chemical Committee of the American Gas Association as a standard reference for procedures to be used by the chemists and chemical engineers of the industry.

The 560-page volume is illustrated and indexed. It may be obtained from the Technical Section, American Gas Association, 420 Lexington Ave., New York 17, N.Y., at a price of $5 to A.G.A. members and $7.50 to others.

INGA Re-elects Officers at First Annual Meeting

The Independent Natural Gas Association of America re-elected all of its officers and six new directors to serve during 1946.

This action was taken at the organization's first annual meeting held in Houston, January 28.

The officers are: E. Buddrus of Chicago, president of the Panhandle Eastern Pipe Line Co., president; Paul Kayser of Houston, president of the El Paso Natural Gas Co., first vice president; J. H. Dunn of Amarillo, president of the Shamrock Oil and Gas Corp., second vice president; F. W. Peters of Tulsa, treasurer of the Oklahoma Natural Gas Co., treasurer, and John A. Ferguson of Washington, D. C., executive director.

The new members of the Board of Directors are: H. W. Bass of Dallas, president of the Trinity Gas Corp.; Frank Buttram of Oklahoma City, president of the Buttram Petroleum Corp.; B. A. Hardy of Shreveport, La., independent operator; D. A. Hulcy of Dallas, president of the Lone Star Gas Co.; F. S. Kelly, Jr., of Shreveport, Arkansas-Louisiana Gas Co.; and Homer W. Long of Guymon, Okla., independent operator.

Oklahoma Association To Meet March 11 and 12

The 1946 convention of the Oklahoma Utilities Association will be held at the Biltmore Hotel, Oklahoma City, March 11 and 12, Miss Kate A. Niblack, secretary, announces. S. I. McElhoes, Public Service Co. of Oklahoma, Tulsa, is chairman of the convention committee.

New officers of the association to serve during 1946 were elected at a meeting held in Tulsa, Dec. 28. They are: A. F. Potter, Gas Service Co., Bartlesville, president; S. I. McElhoes, Public Service Co. of Oklahoma, Tulsa, first vice president; L. A. Farmer, Northern Oklahoma Gas Co., Ponca City, second vice president; E. C. Joullian, Consolidated Gas Utilities Corp., Oklahoma City, treasurer: Miss Kate A. Niblack, Oklahoma City, secretary.

Members of the board of directors, in addition to principal officers named, are: Glenn C. Kiley, Oklahoma City; Frank B. Long and R. K. Lane, Tulsa; J. Y. Wheeler, Ardmore; W. L. Woodward, Alva; J. C. Happenny, Sand Springs, and W. R. Thomas, Ada.

Industrial and Commercial Conference Date Changed

The A.G.A. Conference on Industrial and Commercial Gas, scheduled for the Commodore Perry Hotel, Toledo, March 28 and 29, has been moved one day to March 29 and 30. The two-day program will include addresses and papers on prepared atmospheres, LP Gas standby, heating for plastics processing, commercial water heaters and boilers, the industrial and commercial gas engineer's opportunities, and high speed direct heating.

A.G.A. Home Service Folder

"Home Service, the Road to Opportunity" is the title of a new folder prepared by the Home Service Committee of the A.G.A. Its purpose is to direct attention of teachers and students of home economics toward the importance of home service work as a job and career. The folder can be distributed by gas companies to college students in their areas and to high school home economics clubs. There is keen competition among utilities, food and equipment companies for qualified home economics graduates at this time. The folder also serves as a good consumer piece for people to know just what the gas company home service department is prepared to do. The booklet sells for 4¢ a copy, and there is space on the back cover for a company imprint.

Mid-West Gas Assn. to Meet April 8-10 in St. Paul

The forty-first annual meeting and convention of the Mid-West Gas Association will be held at the St. Paul Hotel, St. Paul, Minn., April 8-10, 1946. President E. C. Deane will be in charge of the program.

CALENDAR

January

Federal Power Commission's Natural Gas Investigations — Biloxi, Miss., Feb. 11 and Chicago, Feb. 19.

Technical Conference on Domestic Gas Research—Cleveland, Feb. 18-19.

March

American Gas Association Midwest Personnel Conference—Kansas City, March 7.

Oklahoma Utilities Association 1946 Convention—Biltmore Hotel, Oklahoma City, March 11-12.

Southern Gas Association—Galvez Hotel and Bucaneer Hotel, Galveston, Texas, March 21-22.

New England Gas Association—Boston, March 21-22.

American Gas Association Conference on Industrial and Commercial Gas Section—Commodore Perry Hotel, Toledo, March 29-30.

April

Federal Power Commission's Natural Gas Investigation—Charleston. W. Va., April 2.

Mid-West Gas Association — St. Paul Hotel, St. Paul, Minn., April 8-10.

American Gas Association Distribution and Motor Vehicle Conference—Hotel Stevens, Chicago, April 16-18.

Southwestern Gas Measurement Short Course — Norman, Okla., April 23-25.

May

American Gas Association Natural Gas Department, Annual Spring Meeting—Hotel Gibson, Cincinnati, May 7-8.

National Association of Corrosion Engineers Annual Meeting—President Hotel, Kansas City, Mo., May 7-9.

Indiana Gas Association, Annual Convention—French Lick Springs Hotel, French Lick, Ind., May 9-10.

Pennsylvania Gas Association—Galen Hall, Wernersville, Pa., May 21-23.

June

American Gas Association Joint Production and Chemical Committee Conference—Hotel Pennsylvania, New York City, June 3-5.

National Fire Protection Association—Boston, June 3-6.

American Gas Association Midwest Personnel Conference—Kansas City, June 6.

Canadian Gas Association, 39th Annual Convention—Mannoir Richelieu Hotel, Murray Bay, Quebec, June 18-21.

October

American Gas Association Annual Convention and Exhibit—Atlantic City, N. J., Oct. 7-11.

A.G.A. to Issue Technical Research Bulletin

The Mixed Gas Research Committee of the A.G.A., a joint committee of the Natural Gas Department and the Technical Section, soon will release a research bulletin of technical data helpful to the gas industry in meeting winter peak load demands. The study includes substitution of gases with heating values from 800 to 1800 Btu per cubic foot for three selected natural gases representative of those commonly distributed.

New equations have been developed for determining limits of flash-back, lifting and yellow tipping when natural gas is employed as the base gas. A method of calculating formula factors and evaluating gases with the use of calculation sheets requiring only simple mathematics makes it possible for operators to evaluate possibilities of interchange of specific gases directly without a knowledge of all the basic theories involved.

Oil Producers Agency Approves Gas Assn. Stand

The Oil Producers Agency recently voted unanimous approval and endorsement of the policy adopted by the Independent Natural Gas Association of California, which stated that natural gas has a definite commodity value and iis by no means merely a by-product of the production of oil. Approval was also voiced by Agency directors of the gas association's opposition to control of end use of gas by the Federal Power Commission or any federal agency.

Home Service Workshops Sponsored by A.G.A.

The home service committee of the Residential Section of the American Gas Association sponsored regional home service workshops in Pittsburgh Jan. 31-Feb. 2 and in Kansas City Feb. 4-6. More than 150 home service directors and sales executives attended each meeting. New developments in gas appliances, resulting from the extensive research program carried on by the industry, were discussed and demonstrated.

A.G.A. Gas Cooking Center At Restaurant Exposition

The American Gas Association is sponsoring a commercial gas cooking center at the first postwar exposition of the National Restaurant Association, March 26-28, Hotel Stevens, Chicago. The latest commercial gas cooking equipment and other gas-fired appliances for restaurant use in water heating, dishwashing, sterilizing, etc., will be on display.

NEGA Elects Directors Of Operating Division

At the January meeting of the Operating Division of the New England Gas Association, the following were elected to the Operating Division board of directors: chairman—S. F. McCallister; vice chairman—Charles W. Rainville, Jr.; secretary-treasurer—Edwin R. Clark; directors—R. B. Berger, Herbert C. Jones, George P. Langton, Edward Niederer, Jr., Harry J. Patterson, George C. Pearl. The 1946-47 nominating committee for the Operating Division also was elected.

A.G.A. Ad Preprints In First TWA Freight Load

Preprints of 14 A.G.A. advertisements to appear in February issues of 25 national magazines and 18 engineering college publications comprised the first shipment to go out of Pittsburgh on the recently inaugurated airfreight service of Transcontinental and Western Air. The new service facilitated early delivery of the preprint booklets to the American Gas Association for distribution to members before publication dates of the magazines.

SGA Meeting to Feature Home Service Workshop

The meeting of the Southern Gas Association, to be held in Galveston Thursday and Friday, March 21 and 22, will be preceded by a one-day home service workshop to be held at the Galvez Hotel, Wednesday, March 20, under the direction of Miss Vivian Marshall. An attendance of 100 to 150 is expected at the workshop. The SGA meeting will be held at the Galvez and Bucaneer Hotels.

Pennsylvania Gas Men Elect Officers

Officers and directors of the Pennsylvania Natural Gas Men's Association were elected at the annual business meeting held in Pittsburgh Jan. 16. Key officers elected were B. D. Phillips, president; E. M. Borger, vice president; B. H. Smyers, Jr., secretary; P. L. Kesel, treasurer and assistant secretary; and Mark Shields executive secretary.

Koppers Co. Purchases Wailes Dove-Hermiston

J. N. Forker, vice president, Koppers Co. Inc., has announced the acquisition by Koppers of all common stock of Wailes Dove-Hermiston Corp., Westfield, N. J., producers of bituminous protective coatings. The New Jersey company will continue to operate as a separate organization with Linden Stuart as president.

Texarkana Firm Has Option To Bring Gas to 3 Cities

The DeQueen, Ark., city council has given a 60-day option to the contracting firm of Kilsby and Alexander of Texarkana for completion of a survey to determine whether the company will build a pipe line and gas distribution system in DeQueen. The towns of Horatio and Lockesburg have given the company the same option.

H. O. Kilsby, spokesman for the firm, told the councilmen that his company will decide within that length of time whether to ask for a franchise and build a line into the section. They have a commitment for purchase of natural gas from the Louisiana-Nevada Transit Co., Okay, La., 33 miles from DeQueen, and have sufficient pipe for the line already purchased.

Phillips Petroleum Sells Eastern Philgas Properties

Phillips Petroleum Co. has entered into a contract for the sale of its Eastern seaboard retail Philgas properties, representing the largest distribution of liquefied petroleum gas in that section of the country, to the Suburban Propane Gas Corp., a newly formed organization, for $11 million, according to an announcement by Frank Phillips, chairman, and K. S. Adams, president. Properties sold are located in eight Atlantic Seaboard states and the District of Columbia.

Under a purchase agreement Phillips will supply the new company with its gas requirements for 20 years, and will give advisory service and grant the right to use certain patents, including those on its Self Service system. Phillips will continue its industrial and wholesale marketing of liquefied gas in the East and plans to become even more aggressive in the Mississippi Valley and Great Lakes areas.

Kalamazoo Stove & Furnace Offers Foreman Conferences

Kalamazoo Stove & Furnace Co. has inaugurated a nine-week series of foreman conferences, during which the company's advertising, competition, sales problems, finances, cost control, product planning and development and testing will be analyzed. C. C. Whitcomb, vice president and sales manager, states that special stress is placed on quickly and easily imparting "know-how" to the worker.

Prof. T. H. Diamond of the University of Michigan, specialist for 20 years in foreman conferences, has been secured to discuss foreman-worker relations. Graydon Willson, who conducted more than 700 conferences in the Training Within Industry program, outlined methods of improvement, principles of motion economy and job instruction technique for the conferences.

$250,000 Gas Plant To Be Built in Victoria, B. C.

A new $250,000 gas plant is to be built in Victoria, B. C., according to an announcement made by W. C. Mainwaring, vice president of the British Columbia Electric Railway Co. The plant is designed to manufacture carbureted gas and coal gas, with capacity to total 1.8 MMcf daily. Two standby plants will swell reserves an additional 850 MMcf daily. Mainwaring said that plans call for completion of the carbureted gas water unit by mid-September of next year.

Two Firms Seek Operating Franchise in Tyler, Texas

Southern Natural Gas Co., Longview, Texas, has received permission to apply to the Tyler City Commission for an operating franchise in Tyler, Texas. This marks the latest step in a long squabble over the request of Tyler Gas Service Co. for a new franchise to replace its expired one. Both companies will appear at the next Commission meeting with detailed propositions as to rates, facilities and other pertinent information.

PEOPLE

• Electric Bond and Share Co. Jan. 14 announced the appointment of **T. C. Wescott** as president of Ebasco Services Inc., its service subsidiary. Wescott succeeds **S. R. Inch** who becomes vice chairman.

T. C. Wescott

Wescott has been with the Bond and Share system in various engineering and executive capacities for 35 years. During this period, he has had extensive business and engineering experience in industrial and utility work both in this country and abroad.

Company officials stated that this appointment was made in connection with the expansion of Ebasco's engineering and technical services to industrial and public utility clients outside the Bond and Share system.

• **T. J. Norton,** sales manager, systems division, Remington Rand, announces the appointment of **H. B. "Mac" Matheny** as manager of the public utility department. Matheny brings to his new assignment 18 years experience with public utility executives in developing systems and procedures for effective administrative control.

• **James C. Barnaby,** consulting engineer of Worthington Pump and Machinery Corp., has been transferred to the general engineering staff at the Harrison Works as assistant director of research and development.

• A number of organization changes have been announced by Consolidated Edison Co. of New York, Inc. **James F. Fairman** was elected vice president in charge of production and operation. **Harold S. Sutton,** executive assistant to **Ralph H. Tapscott, president,** was elected treasurer. **Dr. John J. Wittmer,** personnel and medical director, is now an assistant vice president. **Colin C. Simpson** fills Fairman's former position of assistant vice president, and **Edward E. Hill** becomes executive assistant to **Hudson R. Searing,** executive vice president.

• Ten former members of the American Gas Association Testing Laboratories staff, who have been serving in the armed forces, have returned to positions at the Cleveland and Los Angeles laboratories. Those returning to Cleveland are: **Major Bruce A. McCandless, Naval Lt. Walter B. Kirk, Capt. Robert T. Hlavin, First Lts. Howard L. McPherson, Donald F. Leverett, Frank E. Hodgdon** and **Carl F. Geltz,** and **Staff Sgt. William R. Willes. Capt. John J. Kavanaugh** and **T/Sgt. David G. Willich** have returned to Los Angeles.

• **Chester A. Thorp** has been promoted to the position of chief engineer of research, A.G.A. Testing Laboratories, according to an announcement by **R. M. Conner,** director. Thorp will have charge of all research activities at the Cleveland and Los Angeles laboratories. He joined the Laboratories in October, following his release from the Navy. He formerly headed the gas appliance laboratory jointly maintained by Southern California and Southern Counties Gas Co.'s, Los Angeles.

• The Dealers' and Builders' department of Public Service Co. of Colorado, Denver, is being expanded according to **Roy G. Munroe,** supervisor. Some recent appointments include **Shad J. Tinsley,** supervisor of gas dealers' representatives and **Jack T. Connors,** supervisor of electrical dealers' representatives. **A. A. Roebke,** as supervisor of architects' and builders' representatives, will supply information and other helps to builders who specify gas and electric equipment.

• **D. B. Beecher,** vice president and general manager of Kentucky West Virginia Gas Co., Ashland, Ky., recently announced four appointments made by the company. **H. L. Ley** has been appointed manager of construction and operation. **P. E. Dufendach** is the new manager of engineering and geology, and **O. C. Cornett** has been appointed purchasing agent. **George W. Hereford** is now supervisor of gas measurement.

• Panhandle Eastern Pipe Line Co., Chicago, has announced four promotions. **H. F. Reimers,** former maintenance mechanic at Centralia, is now assistant chief engineer at Olpa. New assistant chief engineer at Centralia is **R. K. Willis,** former engineer at Greenburg. **A. L. Ormiston** is now at Haven as assistant chief engineer and **W. M. Waite** is assistant chief engineer at Houstonia.

• **C. A. Renz,** manager, customer service department, Southern California Gas Co., recently announced several personnel changes. **C. W. Beckett** has been named commercial service supervisor replacing **M. R. Chandler,** who resigned to enter the gas appliance business. **Henry Laird** becomes commercial service foreman succeeding **D. T. Ward** who is the new district service foreman at Beverly Hills.

• **Donald A. Campbell,** manager of the newly-established industrial division of Bryant Heater Co., Cleveland, Ohio, announces the appointment of **Robert M. Buck** and **Robert A. Clark** to the development staff of the division. Both men will join in the development and application of new lines of Bryant gas combustion and control components for industrial process equipment.

• **L. B. Denning, Jr.,** operating manager of the general division of distribution, Lone Star Gas Co., Dallas, announced the return of **E. W. Alexander** from service in the navy to resume his duties as subdistrict manager at Groesbeck. **F. F. McEwin,** acting subdistrict manager during Alexander's absence, will be transferred to other duties.

• **Russell H. Jenney** has resigned from Kentucky West Virginia Gas Co., as superintendent of gas measurement, to become director and chief consultant of the Measurement and Control Service, Louisville, Ky., which offers gas utilities engineering service on measurement and control problems.

• **Dr. Paul H. Price,** former Lt. Col. in the Army Specialist Corps as mineral resource specialist, has returned to his position as West Virginia state geologist. **Dr. A. J. W. Headlee,** survey chemist and gas analyst, resumed his duties Jan. 1 after serving at Johns Hopkins University in secret military work. **Dr. E. T. Heck,** geologist, returned in December after 2½ years in the Navy, and **Dr. J. L. Hall,** assistant to Dr. Headlee, and **John P. Nolting,** geologist, are still serving with the armed forces. Dr. Price states that a new, comprehensive program of survey work is under way.

• **Walter E. Lind,** industry coordinator of the Pacific Gas and Electric Co., San Francisco, has been elected promotional director of the Gas Appliance Society of California, to fill the office left vacant with the resignation of **Harry C. Day.**

• **W. A. Finn,** who was recently released from the Navy, has been appointed export manager of Worthington Pump and Machinery Corp. Finn succeeds **George Gellhorn** who has accepted a position as general manager of C. E. Halaby, one of Worthington's industrial machinery dealers in Colombia, South America.

• **Peter Piket, Jr.,** who has been with the Consumers Power Co., Jackson, Mich., for 18 years, was recently advanced to acting accounting superintendent for the Kalamazoo division, according to an announcement made by division manager **H. S. Richmond.** Piket, who has served as assistant superintendent of accounting since 1941, will replace **Clare F. Battjes,** who resigned.

• **Wm. A. Marsteller** has been appointed general advertising manager of Rockwell Manufacturing Co., Pittsburgh, it was announced Jan. 9 by **A. J. Kerr,** vice president of sales of the Rockwell organization. Marsteller has been vice president in charge of sales, advertising and industrial relations of Edward Valves, Inc., East Chicago, Ind., a subsidiary of the Rockwell Manufacturing Co.

• **K. L. Simons,** for 15 years head of the Houston, Texas, division of United Gas Corp., is retiring and will be succeeded by **W. B. Head, Jr.,** assistant manager of the division since 1942, it has been announced by **J. V. Strange,** vice president and general manager. Head will be succeeded as assistant manager by **James A. Wilson,** who is now division manager at Monroe, La.

• **Emil H. Vieregg,** manager of the Northwestern Public Service Co., Grand Island, Neb., retired on Jan. 31. In 1915 he became superintendent of the Grand Island Gas Co. which was bought by the Central Power Co. in 1924. He be-

came manager, a capacity he has held ever since. Natural gas replaced manufactured gas in 1931, and in 1941 the Central Power Co. sold its gas business to the Northwestern Public Service Co. Vieregg was president of the Mid-West Gas Association in 1930.

• **H. A. Malcom,** former assistant general sales manager of Airtemp Division, Chrysler Corp., was appointed general sales manager, according to **D. W. Russell,** president.

• **A. L. Rothrum** and **R. E. Cady** are new additions to the sales staff of Ruud Manufacturing Co., Pittsburgh, Pa.

• **Paul B. Holmes,** manager of sales, heating division, National Radiator Co., has announced two promotions in the company's sales organization. **John C. Barnes,** former manager of the company's Washington, D.C., branch, has assumed his new duties as branch manager at Philadelphia. **Huber F. Seltzer,** veteran of 34 years in the sales department, replaces Barnes as manager in Washington.

• **R. L. Fowler** has been elected president of Florence Stove Co. to succeed **Eugene Holland** who resigned effective Jan. 31. Fowler served as president of the company from 1931 to 1945, at which time he was elected chairman of the board. He will continue in this position as well as president.

• **Stuart Edward Preston** succeeds the late **Oscar Thal** as manager of the Kitchener Public Utilities Commission in Toronto. Preston became identified with the municipal auditing department of the Hydro-Electric Power Commission of Ontario in 1923.

• **Sam L. Hudd** has been appointed production manager of the George D. Roper Corp., succeeding the late **Harry Morse.** Hudd has been with the Roper Corp. since November, 1944, in the capacity of industrial engineer.

• **W. E. Pierce** has been named advertising manager of Public Service Co. of Northern Illinois, replacing **J. R. Pershall,** who resigned to form his own advertising agency.

• **F. W. Carter,** president of Peerless Manufacturing Corp., announces the return of **Thomas D. Bromley,** manager of the gas-fired heating equipment division. Bromley has been serving with the U. S. Navy since October 1943.

• **Marshall W. Batchelder** has been appointed sales representative for the Caloric Gas Stove Works and assigned to the South Chicago territory, according to an announcement made by **Julius Klein,** general sales director of the company. For the last 20 years, Batchelder has been associated with the American Stove Co.

• **Henry S. Davis,** general manager, Conowingo Power Co. and Southern Pennsylvania Power Co., was recently elected president of the Maryland Utilities Association.

• Receivers of new assignments in the gas department, Philadelphia Electric Co., are **R. H. Whipple,** gas engineer who succeeds **E. E. Witham,** and **J. H. Long,** who replaces Whipple as superintendent of production.

• **A. F. Rice** has been appointed Rheem Manufacturing Co.'s Pacific coast manager, appliance sales, according to an announcement by **Frank J. Nugent,** general manager of appliance sales. Until recently, Rice served as a major with the Army engineers. He has been identified with the appliance [illegible] West for more than 25 years, serving as an executive of Western Stove Co., H. R. Basford Co., Southern California Gas Co. and Occidental Stove Co.

A. F. Rice

H. W. Angell will be district manager for the central and northern California and Nevada district with headquarters in San Francisco. **A. R. Jewell** will be sales representative for the southwest district covering southern California, Arizona and Utah, with headquarters in Los Angeles, and **F. F. Line** will represent the division in Oregon, Washington, Idaho and western Montana with headquarters in Portland.

• **Clarence L. Law,** vice-president, Consolidated Edison Co., New York, has been elected a member of the committee on national advertising of the American Gas Association, according to **D. P. Hartson,** chairman. Law will represent participating companies in the Metropolitan New York area.

• **R. Field Foster** has been appointed manager of the Stargas department of Lone Star Gas Co., Dallas, according to an announcement by **Chester L. May,** vice president. Foster has been a member of the Stargas department since 1929 when he was appointed Stargas engineer. He succeeds **J. Woodward Martin,** who resigned as manager Dec. 1.

• **Lt. Col. Bradford Ross** of Cheyenne, Wyo., was appointed general counsel of the Federal Power Commission on Jan. 12.

• **R. B. Wright** has been appointed New England district sales manager of the Hardwick Stove Co. His headquarters are at 110 Arlington Street, Boston.

• **E. R. Engstrom** is manager of a Pittsburgh factory branch office of Askania Regulator Co., Cleveland, which opened Jan. 1 to handle Askania engineering, sales and service. **C. E. Hague** is now sales manager of the Pittsburgh and Cleveland districts.

• **Emory Wishon,** vice president and general manager of Pacific Gas and Electric Co., has announced the appointment of **James S. Moulton** to succeed **W. G. Vincent,** who died Jan. 29. Moulton has been serving with the Navy since 1942. He was formerly associated with the San Joaquin Light and Power Corp. at Fresno and the Great Western Power Co. and joined PG&E in 1930 when both of these companies were merged with it.

• **Lt. Louis F. Demmler,** USNR, on leave from Ketchum, MacLeod and Grove, Inc., Pittsburgh advertising agency, and formerly director of its gas appliance promotion division, has returned to become director of the agency's research and merchandising dept.

• **Allan W. Lundstrum** has been chosen to head the new research department created by United Gas Corp. **W. F. Hartwig,** former assistant manager of the Shreveport district, has been advanced to assistant general superintendent of production.

Obituaries

• **William Germain Vincent,** vice president and executive engineer of Pacific Gas and Electric Co., died Jan. 29 at his home in San Francisco. In 1904, after a year with Gray Telautograph Co. in New York, Vincent joined that firm in San Francisco. From 1906 to 1912 he was engaged in engineering work for the Ocean Shore Railroad Co., was associated with Prof. C. L. Cory as consulting engineer, and superintended the University of California's light and power department. In 1911 he joined the staff of J. G. White and Co. and became valuation engineer for PG&E in 1912. He was appointed vice president and executive engineer in charge of valuation, rate, land and statistical departments in 1922.

• **Frank A. Newton,** head of the rate and valuation department of the Commonwealth & Southern Corp., died Nov. 16 at Peoria, Ill., following a heart attack. He joined the staff of Commonwealth Power Corp., predecessor to the Commonwealth & Southern Corp., and in 1912 became supervisional chief of rate matters and was transferred to the C&S headquarters in New York in 1930.

• Death of **Rupert J. Daugherty,** 55, long-time public relations man for Cities Service Oil Co., was announced from Bartlesville, Okla., Jan. 12.

First employed by the company in February 1926, he entered public relations work a year later in the gas division. He was appointed director of the information service in 1929 and in 1937 became manager of the industrial relations department. He served 12 years as mayor of Bartlesville.

• **Louis C. Smith,** president of the Harrisburg, Pa. Gas Co., died Dec. 27. He was president of the Pennsylvania Gas Association and assistant managing director of the American Gas Association. Smith was formerly associated with the United Gas Improvement Co., Omaha Gas Co., Fulton County Gas and Electric Co. and New York Power and Light Corp.

• **Benjamin H. Nicoll,** assistant general commercial manager of the Long Island Lighting Co., died recently following an illness of several months. He became associated with the Lighting Co. in 1920, following a number of years spent with the Delaware and Hudson Railroad.

• **W. S. Cadwallader,** retired Chicago district manager for George D. Roper Corp., died recently at the age of 58. Cadwallader had been in the gas industry for 40 years, with Roper 19 years.

OPERATING IDEAS

Method for Replacing Defective Telephone Poles

H. V. JOHNSON, crew foreman, Jackson District, United Gas Pipe Line Co., Shreveport, La.

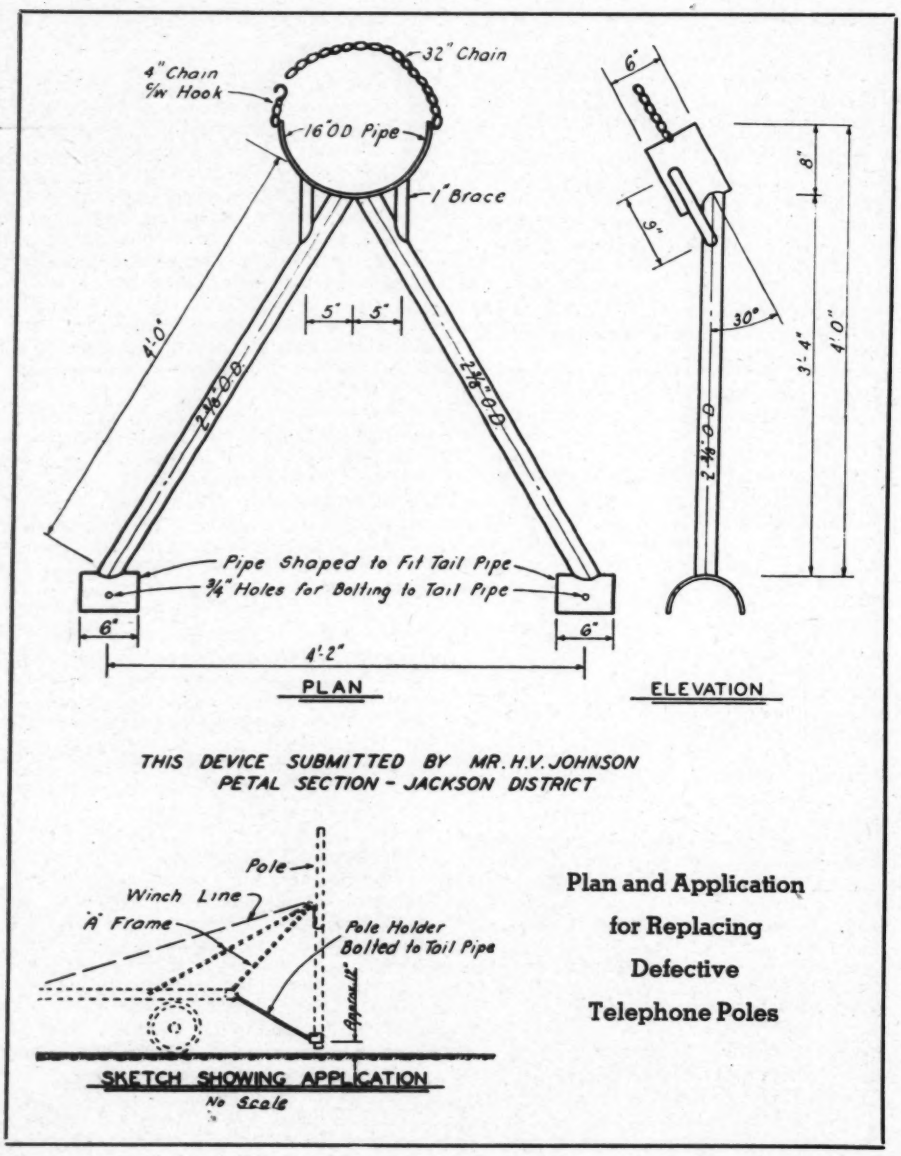
REPLACEMENT of defective telephone poles on lines which, as a usual thing, follow pipe line right of ways, offers one of the off trail duties of maintenance men. And, although they go about the task as a matter of routine, there are not enough of these replacements to make skilled telephone linemen of a crew of pipeliners.

Recently, in the Mobile swamp of United Gas Pipe Line Co.'s Jackson district, a telephone pole replacement job was accomplished the hard way—hoisting and setting with manpower while motor horsepower stood idly by. H. V. Johnson, Hattiesburg crew foreman, thought that there should be some way to ease the task by utilizing the truck motor, and his thinking along this line resulted in the gadget illustrated by the drawing.

The device which makes for safe and easy handling of long and heavy poles through its use in conjunction with a winch truck and an "A" frame, was constructed completely of scrap materials; and, although it is not recommended as a great time saver adaptable to use on extensive telephone construction jobs, it has been found to have certain meritorious features when used by maintenance crews who are not telephone specialists and who of necessity must use horsepower where possible in preference to manpower.

Three men can effectively handle an average-sized telephone pole solely with strong arms and backs and a pair of pike poles. With this device, only one man is required aside from the truck driver who would have to be on hand in any event if the poles were hauled to location from any great distance.

The device has been used with satisfactory results in the Jackson district where it was originated, and the men who have used it recommend it for efficiency and for its safety features. They have found it equally useful in setting long telephone poles and in the vertical installation of the scrap pipe used in ground beds for cathodic protection units.

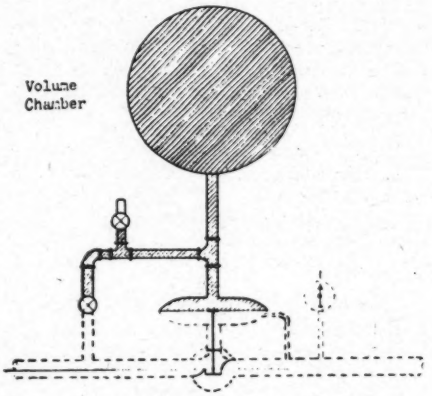


Plan and Application for Replacing Defective Telephone Poles

Pressure Load Regulator

Presented by Measurement Department, El Paso Natural Gas Co., explained by D. H. TUCKER. Presented before the 1945 Wrinkle Class, Southwestern Gas Measurement Short course, conducted by ROY S. PEACE, Jr., Southern Natural Gas Co.

A volume chamber installed as shown in sketch will produce a constant loading pressure on regulator diaphragm. This loading pressure will



give accurate and constant regulation if volume chamber is at least 100 times volume change of regulator diaphragm action.

The advantage of this loading principle is the elimination of pilot regulator troubles.

Precautions to be taken are: all valves and joints in volume chamber and piping must be tight. Volume chamber should be protected from changes in temperature by lagging or burying underground.

Magic Chef DESIGN CONTEST

. . . is solidifying position of

gas cooking in the modern home

● The gas industry is urged to tie in with the Magic Chef $18,000 competition for the best designed gas range of tomorrow. A "package" of suggested news releases has been prepared to suit the needs of the local dealer. These stories are yours by writing the advertising department of American Stove, 4301 Perkins Avenue, Cleveland 3, Ohio.

To the utility companies and Magic Chef dealers this competition means added sales traffic. Contestants are being asked to visit your store for data on today's ranges. This will be a perfect opportunity to acquaint these contestants, and especially your local architects and designers, with the type of gas merchandise you sell. Remember, these designers carry tremendous weight in deciding what appliances will be installed in tomorrow's homes. With these planners thinking now along Magic Chef lines and your store becoming their headquarters for information, you've sub-consciously sold an important part of tomorrow's market.

Gas as an industry comes in for a large share of value from this design promotion. It's a publicity "natural" for local gas companies. Large amounts of space in advertising and news stories are being used to ask the public to help plan America's most popular gas range of the future . . . extra proof that the gas industry is always on the lookout for new ideas. Such space and time by your local press and radio give added importance to gas as the truly modern fuel in your community.

AMERICAN STOVE COMPANY

4301 Perkins Ave. • Cleveland 3, Ohio

NEW YORK • ATLANTA • PHILADELPHIA • CHICAGO
CLEVELAND • ST. LOUIS • LOS ANGELES

Magic Chef

RED WHEEL GAS RANGES AND HEAVY DUTY GAS COOKING EQUIPMENT

LOOK FOR THE FAMOUS RED WHEEL . . .

CURRENT READING

Rotameters, Their Use, Application, Selection and Construction—W. J. Beckett, Bushnell Controls & Equipment Co. Publication No. 22, Southern California Meter Ass'n. Illustrations. A rotameter, device for the measurement of fluid flow, comprises a tapered glass tube fastened in a vertical position in the line of a pipe, in which the fluid is flowing, with a specially designed float that fits snugly at the bottom of the tube. As soon as flow commences, the float rises with the fluid toward the top of the tube. As it rises the annular passage between the float and the tube increases until all the fluid coming through the pipe is allowed to pass. When this occurs and the float comes to a rest, its weight exactly balances the velocity pressure of the fluid plus the float's own buoyancy. Hence, it provides a visible measurement in which the actual fluid itself and its flow through the pipe line can be seen and the variation in flow observed in relation to a calibrated scale.

Present State of the Law of Federal Regulatory Control over "The Production and Gathering of Natural Gas"—Donald C. McCreery, attorney, Denver, Colo. Published by The Interstate Oil Compact Commission, Oklahoma City, Okla. This 22-page booklet is a summary of the discussion presented at the quarterly meeting of The Interstate Oil Compact Commission concerning the effects of recent Supreme Court decisions upon the production and conservation of natural gas.

The Stability of Heated Structures—L. Muir Wilson. A paper presented to the Southern Association of Gas Engineers and Managers in England, Oct. 23, 1945. Reprinted as a supplement to "Gas Times", published by Hallows & Slaughter, 29 Grove Road, Leighton Buzzard, England. This 8-page illustrated paper describes in detail what happens when structures are heated, sources of trouble and corrective measures.

Office Planning and Layout—issued by the Policyholders Service Bureau, Metropolitan Life Insurance Co., 1 Madison Ave., New York 10, N.Y. Available to executives who request it on their business stationery. Illustrated charts, layouts, list of references. This report is a discussion of rearrangement of office space to provide for a smoothly running organization.

Carbon Black in War and Peace—L. H. Cohan. "Chemical and Engineering News," Nov. 25, 1945, pp. 2078-2085, 2145. A review of recent developments in the carbon black industry.

The Determination of the Purity of Hydrocarbons by Measurement of Freezing Points—Augustus R. Glasgow, Jr., Anton J. Streiff, and Frederick D. Rossini of the Section of Thermochemistry and Hydrocarbons. RP 1676, Journal of Research, Nov., 1945, National Bureau of Standards. This report, which was prepared in collaboration with the American Petroleum Institute Research Project 6 on the "Analysis, Purification and Properties of Hydrocarbons", covers the following topics: Principles involved; apparatus and materials required; experimental procedure for a freezing experiment and for a melting experiment; evaluation of the freezing point from a freezing curve and from a melting curve; calculation of the purity when the freezing point for zero impurity is known; evaluation of the freezing point for zero impurity; and determination of the cryoscopic constant.

The Chemical Constituents of Petroleum—by A. N. Sachanen, D.Sc., Research and Development Division, Socony-Vacuum Oil Co., Inc. Published by the Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y.

A considerable part of this book is confined to individual hydrocarbons and compounds, which have been separated from petroleum, as well as to the methods of separation and identification. The data on the content of various types of hydrocarbons and other constituents, expressed in the terms of ring analysis and of conventional classes, together with the methods for determining the structures and classes, make up a large part of this volume.

The Financial Record of the Electric Utility Industry—Issued by Federal Power Commission. 14-page report. Available, free upon request, from FPC. The report, which presents a factual statement of the financial development of the electric utility industry during the years 1937 through 1944, consists of a summary and analysis of the composite financial statements of companies representing in excess of 98% of the privately owned electric utilities in the country. It reveals that the industry distributed approximately 70% more energy per dollar of investment in 1944 than in 1937 and cites numerous points of progress during the seven-year period.

"George Washington Law Review" is the title of a special issue announced for December publication by The Federal Power Commission—1920-45. The book contains 17 articles by leading authors from government, industry and other specialists on FPC regulation under several federal acts including the Natural Gas Act of 1938. Limited printing. Single copy, $2 unbound; $3 bound. Order from The George Washington Law Review, George Washington University, 725 21st Street, N.W., Washington 6, D. C.

Effect of Reservoir Depth on Gas Reserves—K. M. Fagin. "Petroleum Engineer," Oct., 1945, pp. 256, 258, 260. Importance of deeper, higher pressure gas fields is illustrated by charts and tables showing how recovery increases with depth.

Average Gas-Oil Ratio of Nation's Oil Fields—K. M. Fagin. "Petroleum Engineer," Nov., 1945, pp. 51-54. The estimated average gas-oil ratio of all the oil wells in the United States was 1278 cu. ft. per bbl. during 1944 compared with 1109 cu. ft. per bbl. during 1937. The importance of the total annual volume of gas produced from oil wells should be noted by comparison with the volume of gas produced from gas wells. The estimated disposition of all the gas produced is also shown. The growth of the repressuring cycling gas volumes from 84,295 MMcf in 1937 to 755,971 in 1942 is noteworthy.

Carbon Black—W. L. Loving. "Petroleum Engineer," Nov. 1945, pp. 176, etc. This article is a brief history of the art of manufacturing carbon pigments and of the development of the channel, thermal, and furnace processes, the principal methods of manufacture in use at the present time. The relationship between the carbon black and natural gas industries is discussed and a justification of the use of natural gas for carbon black manufacture is made in opposition to the frequent charge that the carbon black industry is a wasteful user of a natural resource.

How to Control Your Labor Costs Through Job Evaluation—A special report for management. Published by Labor Relations Institute, 1776 Broadway, New York 19, N. Y. Price $2.75. The report analyzes tested techniques of job evaluation and presents a description of the advantages of the four principle job evaluation systems, with charts and diagrams of each. It lists problems faced by employers in installing a job evaluation system and suggests procedure to assure union-employee cooperation.

Safe Practices in Compressor Stations—D Attaway. "Petroleum Engineer," Nov., 1945, pp. 55-58. This article accumulates certain safe practices most generally accepted by construction engineers, designers, safety men, compressor manufacturers, and operators in the installation and operation of a gas compressor station. Such safe practices are not to be confused with state and federal laws or regulations.

Piping Handbook — Sabin Crocker. Fourth edition, McGraw-Hill, 1945, 1376 pp. A collection of data on use of piping in all industrial and engineering applications. Includes chapters on gas piping, refrigeration piping, corrosion and protective coatings, underground steam piping, steam powerplant piping, etc.

Practical Petroleum Engineering: Graphic Solutions of Design Problems in Fluid Flow—P. Buthod and B. W. Whitely. "Oil and Gas Journal," Nov. 24, 1945, pp. 130-132. Article 6—Thermodynamics of gas flow.

An Engineer's Viewpoint on Design of Compressor Cylinders for High Pressure Gas Compression—H. A. Gehres. "Calif. Oil World," 2nd Oct. issue, 1945, pp. 5, etc.

Step Forth in '46 to New Freedom ...more fun

Have you been planning to reconvert your old kitchen or "doodling-up" the kind of kitchen you would like in your new home? You will want that kitchen to look smart and modern and efficient. You will want a new automatic Gas Range and Refrigerator, scientifically placed near the sink or food preparation center to save steps, time and work. Thousands of women have fallen in love with the series of designs called the "New Freedom Gas Kitchen." Your gas industry and gas range manufacturers have "kitcheneered" them for you. See them in advertisements in your favorite home magazine or at your local gas appliance dealer.

"This Gas Appliance Ad is being published by this Company in Northern and Central California newspapers."

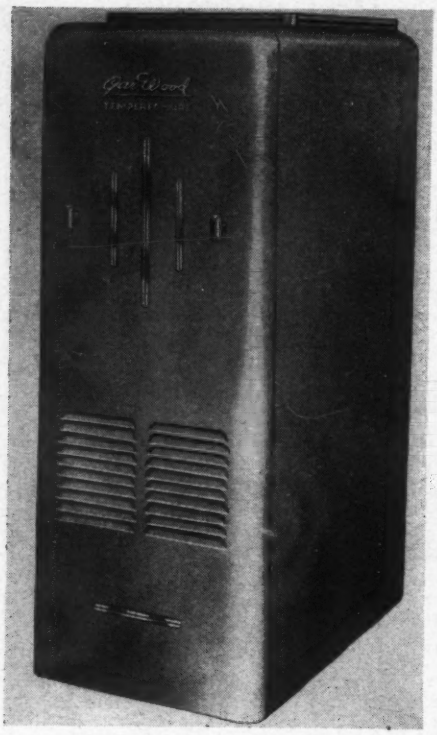
P·G·and·E·
PACIFIC GAS AND ELECTRIC COMPANY

G-202-246

NEW PRODUCTS

Heating Equipment

Gar Wood Industries, 7929 Riopelle St., Detroit 11.
Model: New Gar Wood Tempered-Aire Heating Unit.
Application: For home heating.
Description: Soon to be available in both gas- and oil-fired models, this



new unit will be more compact and will operate at higher efficiency than its prewar predecessors, according to the manufacturer.

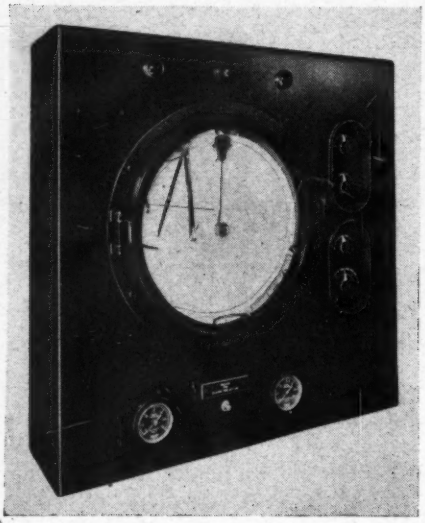
The new models will be built almost entirely of die formed parts which make possible easier assembly, better operation, simplified service, improved appearance and a greatly expanded manufacturing capacity.

Protective Mask

Mine Safety Appliances Co., Pittsburgh, Pa.
Model: M.S.A. Chemox Oxygen Breathing Apparatus.
Application: Ideally suited to the requirements of industry and fire departments in meeting any emergency where high concentrations of poisonous gas or oxygen deficiencies are encountered.
Description: A unique principle is employed by the mask to generate its own oxygen supply, operating independently of the outside air. Exhaled breath passes from the facepiece through the exhalation tube and into the canister where carbon dioxide is removed. Evolved oxygen flows into the breathing bag reservoir, then to the facepiece through the inhalation tube. The mask is simple to use, quickly put on and has a safety device in the form of an alarm bell which rings a warning to replace the canister with a fresh one. A descriptive bulletin BM-8 is available on request.

Automatic Temperature Controller

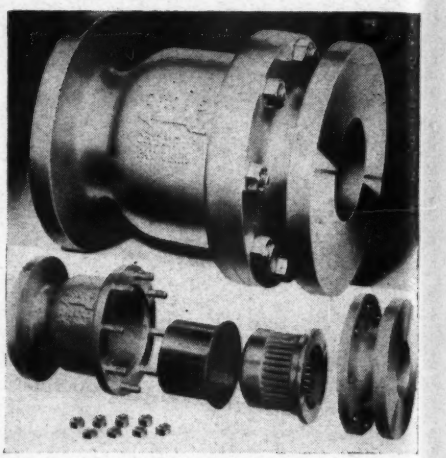
The Foxboro Co., Foxboro, Mass.
Model: CycleLog Controller.
Application: For batch-type processes and other operations where rate of temperature increase or decrease must be controlled, such as batch dyeing.
Description: The instrument controls and records all the steps of a complete process cycle automatically by adjustments of four setting knobs on the instrument panel. In batch dyeing, for example, it will bring the bath temperature up from any starting point to the desired holding point, regardless of daily or seasonal variations, at any



desired rate of rise from 1 to 8 degrees F per minute. Then it will hold the bath at exactly the correct temperature for the proper period of time, shut off the heat supply and signal the operator that the cycle has been completed. By reference to the instrument chart any cycle can be exactly duplicated.

Check Valve

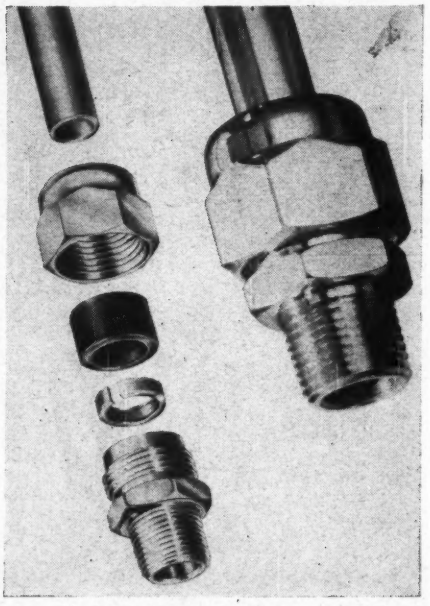
Grove Regulator Co., 6552 Green St. at 65th, Oakland 8, Calif.
Model: Grove Chexflo Valve.
Application: Particularly suited for handling highly corrosive and errosive air, gases or liquids.
Description: A synthetic rubber tube, stretched over a slotted, cup-shaped metal core, expands to open and contracts to close. Because the expansible tube closes instantly on balanced flow, prior to the commencement of back flow, there is never any tendency to establish pressure impulses, shock or water hammer through the flow line.



The flexive tube possesses a uniform spring rate which avoids inertia being set up to cause operation beyond flow requirements. The valve uses no metallic moving parts and is self-compensating and wear resistant.

Tube Fittings

Gustin-Bacon Manufacturing Co., Kansas City, Mo.
Model: Flexigrip Tubing Fitting.
Application: For tubing applications where vibration or leakage are important considerations. Eliminates flaring, swedging or soldering the tube end and adds to the strength of the joint. Saves time, labor and material.
Description: Made in standard sizes from ⅛-in. to 1½ in. O.D. The fitting consists of four parts—the body, a gripping ring, synthetic rubber gasket



and nut. The nut (with gasket and ring inside) is slipped over any plain-end tube and cut to desired length. The tubing end is inserted into the body as far as it will go and the nut tightened, which compresses the ring into a tight grip and moulds the gasket around the ring for a leak-proof seal that is so flexible it will withstand unusual vibration or impulse. Flexigrip fittings are available in brass, aluminum or steel.

New Rheem Water Heaters, packed with improvements, are rolling off assembly lines

ALL NINE Rheem appliance plants are once again manufacturing things that make living more comfortable. Automatic water heaters for all fuels, floor furnaces, console and wall heaters, automatic coal stokers, water softeners, range boilers and other items are coming off our lines in daily-increasing volume.

These latest versions of time-tested Rheem appliances carry important new features — thanks to critical laboratory research that never stops looking for product improvements.

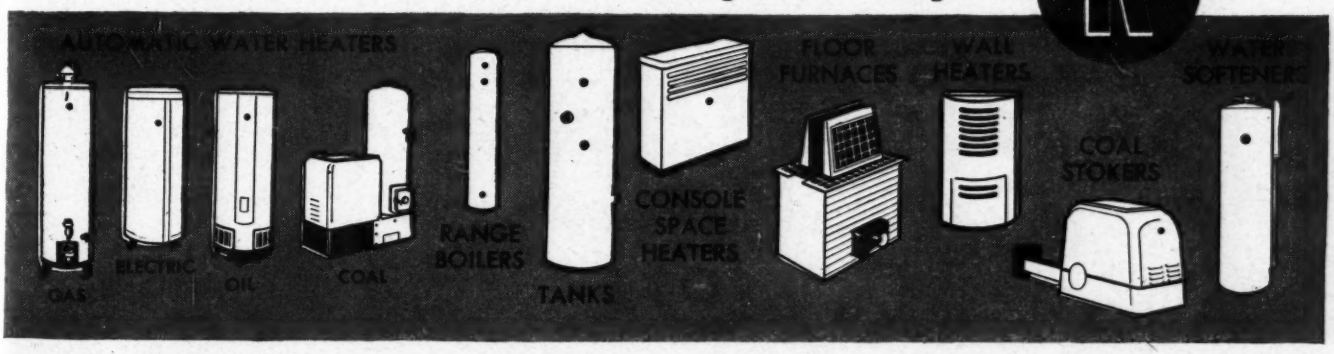
You'll be glad to know, for instance, that the new Rheem 600 Automatic Gas Water Heater pictured above is equipped with the Rheem-built 100% Control. This truly vital safety feature utilizes the Baso-Thermal Magnetic principle... guarantees positive shutoff of both the main gas supply and the pilot gas supply if the pilot light goes out. The Rheem 100% Control is designed and manufactured for use with all types of gases.

We've told you to expect even higher quality in Rheem postwar products, and that's what you'll find—in every appliance in the complete Rheem line.

RHEEM MANUFACTURING COMPANY

General Sales Offices

New York • San Francisco • Los Angeles • Chicago

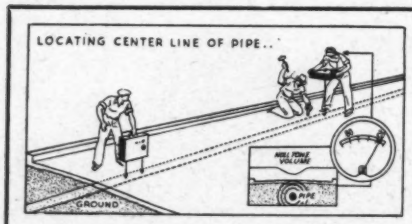


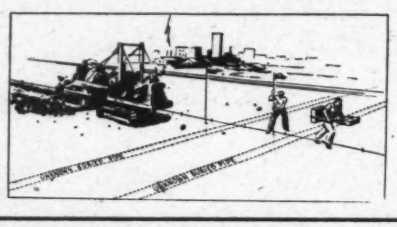
• Non-metallic Transite Flue Pipe not only is rustproof, it is light in weight . . . easy to install and support . . . can be cut to fit on the job. Neat and attractive in appearance, it needs no painting. 2" to 12" sizes; round and oval. Complete line of fittings and accessories.

For details, write for booklet TR-13A. Johns-Manville, 22 East 40th Street, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville **TRANSITE FLUE PIPE** For venting gas-burning appliances





M-SCOPE

Buried Pipe and Cable Finder

16 PAGE BOOKLET FREE UPON REQUEST

FISHER RESEARCH LABORATORY

Palo Alto, California

Catalogs

• **Surface Combustion Corp., Toledo 1, Ohio**—Case hardening in standard rated furnaces is described in a 4-page bulletin, No. SC-127. Application of pack, liquid and gas carburizing is covered and the ideal types of furnaces for the various methods are shown, together with illustrations of case-hardened steel parts and actual furnace installations. A table of pot recommendations, including pot materials, maximum bath temperatures and type and composition of salt baths is included.

Another 4-page bulletin, No. SC-128, issued by Surface Combustion Corp. describes radiant tube heating for use in both ferrous and non-ferrous metal processing. It shows a schematic view of a radiant tube and includes illustrations of some of the types of furnaces in which the use of radiant tubes is advantageous.

• **Wilson Welder & Metals Co., Inc.,** 60 East 42nd St., New York 17, N.Y.—This company has issued a 32-page illustrated catalog designed to guide electrode users in the selection of the right electrodes for any specific job on a wide variety of base metals. Electrodes are recommended for use on mild steel, alloy steels, low alloy high tensile steel and stainless steels. Additional sections are devoted to electrodes for non-ferrous metals such as aluminum bronze, aluminum and manganese bronze. Chemical analyses, specifications and other engineering data are supplied for each electrode. Copies of the catalog may be obtained from the above address.

• **Blaw-Knox Co.,** Pittsburgh, Pa.—Conclusions of engineers regarding the design of piping layouts for flexibility have been published in a booklet entitled "Blaw-Knox Functional Spring Hangers and Vibration Eliminators". It gives many details concerning standard and special types and sizes of functional spring hangers and vibration eliminators, with instructions for their installation, and engineering information which will be of help when adoption of this type of support is under consideration.

• **Wheelco Instruments Co.,** Chicago 7, Ill.—A new edition, bulletin S2-6, of the Wheelco Thermocouple Data Book and Catalog is now available. It gives information on selection of proper thermocouples and carries installation aids, describes and lists prices and recommendations on thermocouples, thermocouple wire, lead wire, heads, connectors, plug and socket assemblies, insulators, and protecting tubes.

• **Worthington Pump and Machinery Corp., Harrison. N.J.**—Three new bulletins are available from this firm. W-487-B11 describes steam-jacketed rotary pumps for melted materials or highly viscous liquids requiring preheating. Equipment for refrigeration and air conditioning is discussed in WP-1099-B48, and C-1100-B14 is devoted entirely to centrifugal refrigeration.

Vapor Pressures and Boiling Points of Hydrocarbons

The results of an investigation on the vapor pressures and boiling points of a large number of purified hydrocarbons are published in the "Journal of Research" (RP 1670) Sept., 1945. This work forms part of the American Petroleum Institute's Research Projects 6 and 44 and was performed by C. B. Willingham, W. J. Taylor, J. M. Pignocco, and F. D. Rossini of the Bureau's Section on Thermochemistry and Hydrocarbons.

Measuerments of vapor pressures and boiling points, over the range 47 to 780 millimeters of mercury and above about 12° C, were made on 52 purified hydrocarbons. The apparatus consisted of an electrically heated boiler, a vapor space with a vertical reentrant tube containing a platinum thermometer having a resistance of 25 ohms, and a condenser. Measurements of the temperature of the liquid-vapor equilibrium were made at 20 fixed pressures maintained automatically. The pressure values were determined by calibrating the apparatus with water, using vapor pressure-temperature tables prepared at the Bureau.

West Coast Meetings for Servicemen Scheduled

Glenn Martin, sales engineer for Domestic Thermostat Co., Los Angeles, is arranging a tour during which he will appear before the personnel of service departments of public utility companies in San Francisco, Portland, Seattle, Salt Lake and other cities in the West. Martin recently completed a three months' tour of principal Midwest and Eastern cities where he visited service managers of public utility companies and held educational meetings for the field personnel.

During these meetings Martin discussed procedures for servicing water heater controls, automatic pilots and rod and tube thermostats. Special demonstrations were made to emphasize the precision techniques necessary to insure maximum efficiency of delicate mechanisms in thermostat control units. In presenting his information to these groups, Martin used drawings, cutaway controls and operative demonstration boards. The latter permitted servicemen actually to practice adjustments and to assemble and disassemble units.

Northwestern Utilities Ltd. Plans $4.5 Million Expansion

Northwestern Utilities Ltd. of Edmonton, Alberta, announces it will spend $4.5 million in extension of natural gas services in central and northern Alberta during the next four years. Northwestern Utilities Ltd., like its electrical affiliate, Canadian Utilitiies Ltd., is a subsidiary of International Utilities Corp. of New York, which is financing developments by the two companies amounting to about $7 million.

The gas company plans to lay 20 miles of 16-in. pipe from the Kinsella fields to Edmonton.

Julian Garrett, general manager, stated work on both projects would be started immediately and he hoped that gas could be piped before the year's end.

Famous Facts

The hand of the famous Statue of Liberty was first exhibited in Philadelphia in 1876 at the Centennial Celebration of American Independence. Later in the same year it was shown at Madison Square in New York and then returned to France. On July 4, 1884, in Paris, the complete 152-foot copper statue was formally presented to the people of the United States by the people of France in commemoration of the 100th anniversary of American Independence. The following year it was taken apart, brought to America, and erected on Bedloe's Island in the great harbor of New York, where it was dedicated before a million people, October 28, 1886.

The first exhibition of a protective coating that would give effective, long-time protection to underwater and underground surfaces exposed to severe corrosive influences was given by Bitumastic Enamel in the early 1850's. Since then it has made history time after time in resisting corrosion on the job.

In the early 1900's Bitumastic Enamel started to displace the inadequate materials then being used for pipe line coating. Since then it has literally saved many millions of dollars to the oil and gas industry in extending the life of essential and costly pipe lines. Few products in any industry are held in such high esteem.

WAILES DOVE-HERMISTON

CORPORATION

Westfield, New Jersey

New York 4 • Philadelphia 8 • Cleveland 14 • Chicago 3 • Houston 2
Tulsa 3 • Miami 36 • San Francisco 10 • Los Angeles 2

Interstate Natural to Serve Two New Louisiana Towns

The FPC has authorized the Interstate Natural Gas Co. to sell natural gas at wholesale to the towns of Clinton and Slaughter, La., for resale to customers. Neither town has had gas service before. Clinton estimates its demands at 40,000 Mcf annually and has already completed its distribution system. Slaughter, whose estimated annual demands are 2880 Mcf, expects to complete installation of its distribution system before early spring. Interstate deliveries will be made from points on its interstate pipe line, which extends from the Monroe field to Baton Rouge.

United Gas Pipe Line Uses Radio-Telephone Network

United Gas Pipe Line Co., Shreveport, is using a radio-telephone network to operate its 24-in. gas pipe line with three central stations in Shreveport and Sterlington, La., and Carthage, Texas. Company service cars and trucks have been equipped with 44 portable mobile units. The equipment is designed to operate on two separate channels for station-to-station, car-to-car and station-to-car transmission. The network is the first of its kind in the Southwest and has been approved by the Federal Communications Commission.

Rates Set for Gas Service to Panama, Oklahoma

The Gas Service Co., Poteau, Okla., has extended its distribution service to Panama, Okla. The Oklahoma Corporation Commission has authorized the company to charge the following rates at Panama: first 5000 cu. ft. per month —55c per Mcf.; second 5000 cu. ft.—45c; third 5000 cu. ft.—35c; next 35,000 cu. ft.—25c; in excess of 50,000 cu. ft. 20c.

Handley-Brown Heater Co. Completes New Factory

H. E. Handley, president and general manager, Handley Brown Heater Co., announces completion of a new factory plant at Jackson, Mich., scientifically planned to meet the expanded production program of the company's gas water heaters and gas conversion burners. Handley says the new factory, which is an all steel and brick monitor type structure, is designed to manufacture exclusively gas conversion burners and gas automatic storage water heaters for home installation. Patented design products feature the "U" tube line of water heaters, Fuel Door and H-B conversion burners.

State Supply Co. New Appliance Distributor

The State Supply Co., Portland, Ore., is a newly incorporated firm handling furnaces, automatic controls, heating and ventilating equipment, plumbing specialties and home appliances. Leon Gosling, president, was formerly district manager for Pacific Coast Heating & Appliance Co., and Gene Narregan, now associated with the new company, was superintendent of Pacific Coast Heating & Appliance.

CLIP THIS AND MAIL TODAY

IF YOU ARE NOT A REGULAR SUBSCRIBER TO **GAS**

In GAS each month you will find dozens of ideas that will help you know your business better and do your job better. Just one of these ideas coming to you on our pages can pay you many, many times the small cost of a subscription.

GAS ... 1709 WEST EIGHTH ST., LOS ANGELES 14, CALIFORNIA

Please enter my subscription to GAS for ...

1 YEAR $2.00 ☐

☐ Check is enclosed ☐ Please bill me

NAME_____ POSITION_____

COMPANY_____

STREET CITY ZONE STATE

Panhandle Improvements Increase Line Capacity

A $10 million improvement program recently was completed in record time by Panhandle Eastern Pipe Line Co., Kansas City, in an effort to insure a more adequate natural gas supply to the industrial areas of Ohio, Michigan and West Virginia. The program, which called for the installation of 33 compressor units aggregating 32,800 hp, the laying of 31 miles of 24-in. pipe line and other improvements, was completed in seven months. The new equipment will enable the company to pump an additional 50 MMcf of gas daily from Texas to Ohio, West Virginia, eastern Indiana and lower Michigan, bringing its daily capacity up to 380 MMcf.

1945 Texas Gas Production Up 213 Billion Cubic Feet

The engineering department of the oil and gas division of the Texas Railroad Commission, Austin, has reported that the total sweet, sour and casinghead gas produced in Texas for 1945 was 2,648,069 MMcf, approximately 213 billion cu. ft. more than the previous year. Carbon black produced during 1945 amounted to 662.9 million lb., as compared with 483.3 million lb. in 1944. Texas had 92.2 million lb. of carbon black stored in 1945, against the 1944 figure of 54.6 million.

Savanah-St. Augustine Co. Seeks Florida Gas Firms

The Savannah-St. Augustine Co. has applied to the Georgia Public Service Commission for permission to recapitalize and to acquire gas manufacturing properties in Florida. Under the plan the company, headed by H. Hansel Hillyer, would acquire plants at Sanford and Orlando, Fla., for $1,210,000. The company would change its name to the South Atlantic Gas Co.

Brooklyn Union Gas Sendout Reaches Peak in 1945

Brooklyn Union Gas Co. has announced that for the fourth year in a row and the ninth time in the past decade, the company's gas sendout has shown a substantial gain over the previous year. The new record of 29,605.5 MMcf is 3.87% over 1944 and 38% over the sendout in 1935.

B. C. Electric Expanding In Vancouver and Victoria

The B. C. Electric Co. is spending a total of $3 million in Vancouver and Victoria as part of the company's expansion plans. New gas plants are on order for both cities, and a new 12-in. gas main is being laid in Vancouver to improve gas pressure in that and surrounding areas.

Gas Pipe Line Film Shown

The Southern California Gas Co. has shown a color movie, "A Pipe Line Licks the Weather", to a number of divisions of the company and to a few outside groups. Deke Houlgate, who is in charge of bookings for the picture, reports that over 700 employees have seen the film.

Consolidated Edison Reaches Wage Agreement with Union

Patrick McGrath, chairman of the Joint Council of the Brotherhood of Consolidated Edison Employees affiliated with the Utility Workers' Union of America (CIO), and Ralph H. Tapscott, president of Consolidated Edison Co., Jan. 17 issued a statement which announced and summarized the results of the collective bargaining negotiations which have been in progress between the Union and the System Companies.

The wage settlements and increases agreed on are estimated to amount to about $10.3 million for the years 1945-46. For 1945, as no agreement on wage increases was arrived at because of the National Wage Stabilization policy, more than 23,000 present active employees will receive a settlement of $100 in cash, if they were on the payrolls in 1945 prior to April 1, or a pro-rata part of that amount if they were regularly employed during one or more subsequent quarters of the year.

For 1946, the active regular employees on the weekly payrolls of Feb. 17, 1946, will, with a few stated exceptions, receive a wage rate increase of 15¢ per hour from that date, and the maximum rates and ranges of pay will be raised accordingly. In addition, the wage progression plan put in effect by agreement of the Brotherhood and the companies in 1944, with its provisions for automatic progression increases and merit increases, is re-established as of Feb. 17, 1946, on the basis of 1945 status and work performance.

Louisiana Conservation Program Under Way

A half million dollar gas conservation program for Louisiana was announced at Baton Rouge Jan. 10 by officials of the Humble Oil and Refining Co., following conferences with state commissioner Joseph McHugh of the state department of conservation.

Hines Baker, Humble executive vice president, said more than $500,000 would be spent immediately to eliminate the venting of casinghead gas or gas from oil wells, by injecting it into reservoirs wherever possible. Humble is already using 26% of its casinghead gas, and upon completion of the projects under way, the percentage of gas being utilized will be increased to 76%.

Brooklyn Union Gas Co. Uses New Gas Generator Set

Greenpoint Works of The Brooklyn Union Gas Co. recently started up the first of two new carbureted water gas sets and stepped up production considerably, despite a cold wave. The plant turned out 63,541,000 cu. ft. one day, which helped keep holders adequately filled during the heavy demand.

California Pacific Expands

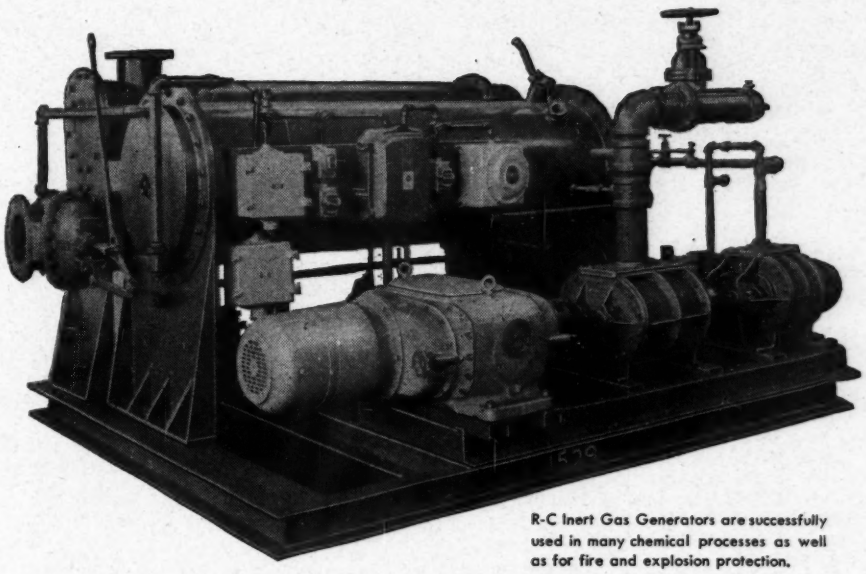
California Pacific Utilities Co., which operates gas, water and electric divisions in California, Nevada, Arizona, Oregon and Idaho, has acquired Eastern Oregon Light & Power Co. With this addition, California Pacific is carrying about 16,000 electric power consumers.

PUT R-C

dual-ability

ON GUARD AGAINST

FIRE and EXPLOSION HAZARDS



R-C Inert Gas Generators are successfully used in many chemical processes as well as for fire and explosion protection.

For simple, dependable protection against the hazards of explosion or fire, wherever inflammable gases or liquids are stored or handled, Roots-Connersville Inert Gas Generators are the *safe* answer.

R-C units produce oxygen-free gas at low cost. They burn gas or oil. The volume of inert gas delivered is unaffected by back-pressure variations. They are simply and sturdily built for long-time dependability.

Most important of all, they incorporate the *dual-ability* of Roots-Connersville to design and to build such equipment successfully, gained from almost a century of experience in building air and gas handling equipment.

Write for Bulletin 100-B-14, or consult us about explosion protection.

ROOTS-CONNERSVILLE BLOWER CORP.
One of the Dresser Industries
602 Oregon Avenue, Connersville, Indiana

Roots CONNERSVILLE SINCE 1854

INERT GAS GENERATORS

ROTARY POSITIVE AND CENTRIFUGAL BLOWERS • EXHAUSTERS • BOOSTERS
LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

This organization is staffed and equipped to design, fabricate and erect any kind of tank you want—anywhere you want it. This includes dry seal gas holders, condensers, rectifying towers, butadiene storage, gasoline storage, accumulators—the complete list includes well over 300 different kinds of tanks!

When you ask Stacey Brothers to bid on a tank you may be surprised to find unusual recommendations regarding design and construction features. You will profit from these innovations in terms of weight reduction, longer tank life and lower initial cost.

Our bid won't cost you a cent; it may save you thousands of dollars. Why not give us the opportunity . . .

THE STACEY BROTHERS GAS CONSTRUCTION COMPANY

One of the Dresser Industries

5535 Vine Street Cincinnati 16, Ohio

Stacey Brothers TANKS

ANY PRACTICAL SIZE OR SHAPE OF TANK. This Stacey-Klonne type dry seal gas holder has a ten million cubic foot capacity. In this design a "piston", with a patented mechanical seal, moves up or down in the shell as gas volume increases or decreases

Mission Water Heater Corp. Now Mission Appliance Corp.

The Mission Water Heater Corp. of Los Angeles, will henceforth be known as the Mission Appliance Corp.

A. H. Sutton

"The reason for the change," says A. H. Sutton, president, "is that the original name of Mission Water Heater Corp. is too restricted. It implies that the company is limited to water heater manufacture. It is planned, sometime in the future, that other products besides water heaters will be added to the line, and therefore the new name of Mission Appliance Corp. will be more appropriate for this wider variety of products."

Rehabilitation Aid Built By Philadelphia Electric

In response to an appeal for aid from the Metropolitan Philadelphia Society for Crippled Children, Philadelphia Electric Co. has built a portable blackboard-type device to be used in rehabilitation of crippled or amputee veterans. Practice equipment is mounted on each side of the board for use in relearning routine daily tasks. The equipment includes electrical sockets, push button and pull chain sockets, door knob, push bell, refrigerator door with latch, padlock, bolt, door with key, water faucet, drawer, shower bath control, radio dial, telephones, etc. Norman Keidel, foreman carpenter of operating maintenance, built the equipment now in use by the Society.

Oklahoma Body Surveys Conservation Rules

The oil and gas conservation department of the Oklahoma Corporation Commission is making a survey to determine whether the general rules and regulations of the Commission are sufficient to accomplish conservation results desired.

The department has asked operators, engineers and attorneys to point out any loopholes or omissions that may exist and to suggest new rules or amendments. Department staff includes: Walker T. Pound, conservation officer; Lawrence Alley, chief clerk; Dan O. Howard, geologist; Elmer Capshaw, gas engineer; and Floyd Green, conservation attorney.

South Atlantic Gas Co. Takes Over Florida System

The South Atlantic Gas Co. recently took over the complete operation of the gas system formerly controlled by the Florida Power Corp. The new company will operate gas service in Sanford and four other Florida cities as well as in Savannah, Ga.

H. Hansel Hillyer is president of the new company and Buell G. Duncan is vice president and general manager.

GAS METER INDEXES AND FITTINGS

Many Standard Meter Parts Carried in Stock

We will be pleased to submit quotations to your specifications and blueprints.

THE E. F. GRIFFITHS CO.

346 E. Walnut Lane **Philadelphia 44, Penna.**

PIPE LINE NEWS

• The Federal Power Commission has set hearing for Feb. 13 in Washington, D. C., on applications filed by **El Paso Natural Gas Co.** and **Southern California** and **Southern Counties Gas Co.'s** to construct, maintain, and operate a 1200-mile pipe line to transmit natural gas from the Permian Basin, Panhandle, and Hugoton fields to California. The line, scheduled to go into operation in 1947, will deliver 175 MMcf daily. Initial cost is estimated at $12 million with an additional $3 million cost for compressor facilities to boost capacities to 305 MMcf.

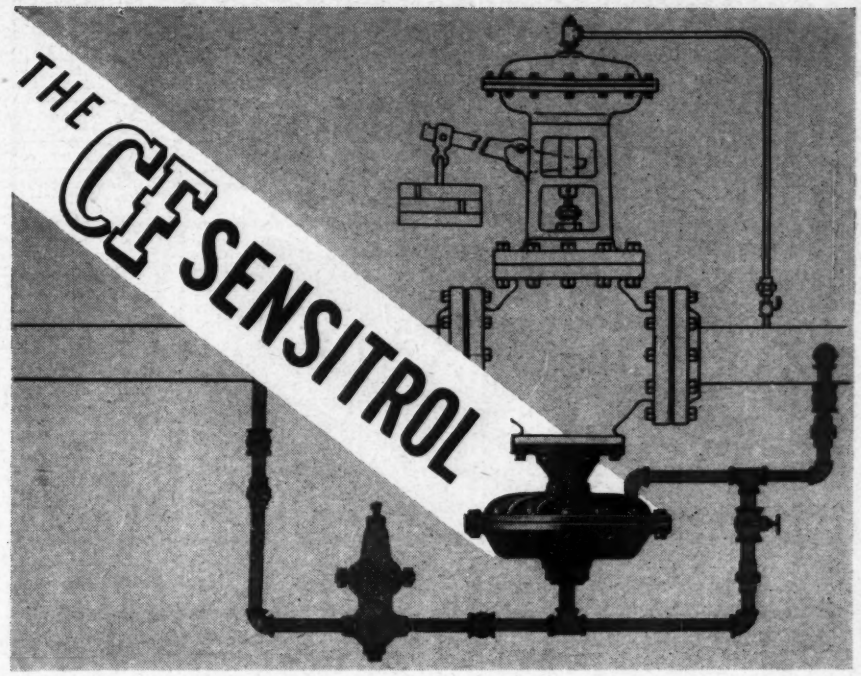
• On Jan. 2 the Federal Power Commission authorized **Tennessee Natural Gas Lines, Inc.**, to construct 14 miles of pipe line to serve Nashville, Tenn. The line, extending from Westernia to Nashville, will connect facilities of the **Tennessee Gas and Transmission Co.** with those of the **Nashville Gas and Heating Co.** Rates charged by Tennessee Natural for gas delivered through this new line are to be approved in advance by FPC.

• FPC has denied petitions filed by **Kentucky-Natural Gas Corp.** for rehearing of the Commission's order of Sept. 7, 1945, which authorized Illinois Central Public Service Co. to construct and operate facilities enabling it to buy gas direct from **Panhandle Eastern Pipe Line Co.** instead of from Kentucky-Natural, and dismissed an application of Kentucky-Natural to construct similar facilities to augment the supply of natural gas sold to Central Illinois. FPC said no new facts or principles of law had been presented.

• A hearing on the **Metropolitan Eastern Corp.'s** application for a certificate to construct and operate an 825-mile, 18-in. natural gas pipe line from the Carthage field in Texas to Hamilton, Ohio, has been postponed from Jan. 15 to April 15 at the company's request. The proposed line, including five compressor stations and a dehydration plant, is estimated to cost $23.5 million and would have an initial daily capacity of 140 MMcf.

• **Colorado Interstate Gas Co.**, Denver, which supplies central Colorado cities and Cheyenne, Wyo., with natural gas from northwest Texas, completed installations costing $750,000 to increase pipeline capacity by 8 MMcf per day. Present capacity of the 20-in. line from Colorado Springs to Denver is 88 MMcf at 14.65 lbs. pressure. Improvements include installation of 10 compressors. Stearns-Rogers Manufacturing Co. has the contract.

• On Feb. 27 the FPC will reopen hearings on applications filed by **Tennessee Gas and Transmission Co.** for authority to build about 96 miles of pipe line and a dehydration plant in Texas. At the same time the Commission will consider a new application for authority to acquire from the Reconstruction Finance Corp. four compressor stations in Mississippi, Tennessee and Kentucky.



Gives

PILOT-LOADING CONTROL

for High and Low Pressures

An auxiliary pilot-loading mechanism for use with a weight-loaded gas regulator in controlling high, medium, or low outlet pressures. Easy installation, more accurate regulation, increased usable capacity, uninterrupted service, operation on lower line pressures to reduce leakage, bleed into the outlet — not the atmosphere — at all times. Can be attached to a regulator already in use, with no other change. For new installations, furnished with a regulator of correct type and size.

SENSITROL is of rugged construction, trouble-free in service. Write for Bulletin 150.

THE CHAPLIN-FULTON MFG. CO.

38 PENN AVE. PITTSBURGH, PA.

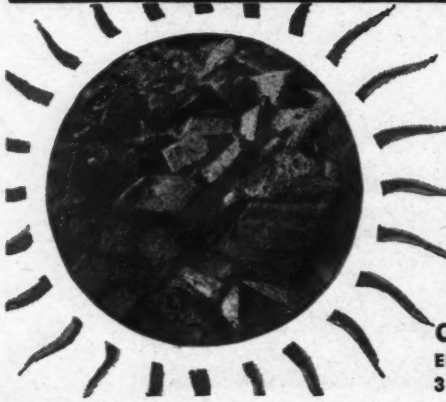
SEMET-SOLVAY ENGINEERING CORPORATION

Blue Gas Plants
Water Gas Machines
Washer Coolers
Naphthalene Scrubbers
Gas Purifiers
Condensers
Waste Heat Boilers
Producer Gas Plants

40 RECTOR STREET, NEW YORK, N. Y.

Good News
BETA PENS
NOW AVAILABLE FOR IMMEDIATE DELIVERY
We've increased production again, so your orders for all styles of Beta Pens can be filled at once. • Beta Pens fit all instruments, have 2 to 4 times more ink capacity and use ink to the last drop. They make a uniform, unbroken line regardless of line thickness without excessive flow or blotting. Pens, shown actual size, can be arranged to reduce time interval between static and differential lines to few minutes only. Especially suitable for seven-day records, volumetric arms and pulsating flow. Order now — Price $1.00 (lower in quantity) — and remember, you get your money back if not completely satisfied.
No. 301
No. 300
No. 200
No. 100
No. 101
SEND FOR ARCCO CHART LIST
AMERICAN
RECORDING CHART CO.
3113 E. 11th St. Los Angeles 23, California
SEND FOR COMPLETE LIST OF ARCCO CHARTS

CONNELLY IRON SPONGE



High in efficiency . . . low in cost. In hundreds of plants throughout the country, Connelly Iron Sponge has proven itself . . . the finest purification material on the market. Not only does it lower your purifying cost but its high activity and capacity tends to reduce distribution and service complaints because of the cleaner gas which ultimately lowers operating and maintenance costs.

If you have a problem in gas purification, Connelly's 68 years of experience is at your service. Our engineers can help you . . there is no obligation on your part.

CONNELLY IRON SPONGE & GOVERNOR CO.
Elizabeth, N. J. Los Angeles, Calif.
3154 S. California Ave., Chicago 8, Illinois

GAS PRODUCTION

• As a conservation measure the **Oklahoma Corporation Commission,** Jan. 3, set the maximum gas-oil ratio for the Hunton lime of the West Edmond, Okla., field at 3072 cu. ft. of gas per barrel of oil. Under a previous emergency order the ratio was 3364 to 1, a temporary increase from 2000 to 1.

The Kansas commission set a January gas-oil ratio of 4000 cu. ft. of gas to one barrel of oil for the Zenith oil and gas pool of Stafford and Reno counties. An increase in gas production over the basic 2000 to 1 ratio was sought by Zenith pool operators at a recent hearing at Wichita.

• The six dry gas wells of the **Quinque Oil & Gas Co.,** Liberal, Kan., which provide fuel gas for that city, have been exempted from proration regulations of the Kansas Corporation Commission governing other wells in the Hugoton field, Kansas.

The commission found that unless these wells are released, the company will be unable to supply the requirements of the Liberal market during the winter months of 1945 and 1946.

• On Jan. 24 gas was discovered 10 miles south of Garden City, Kan., establishing a new boundary line for the vast Hugoton oil field. Fred Koch, Wichita operator, gauged his first test at 7.9 MMcf daily capacity after three acidizations.

CRC Reduces Rates Charged by PG&E

The California Railroad Commission Jan. 23 issued an order bringing about total reduction in gas revenues of the Pacific Gas & Electric Co. estimated at $3.5 million. The new rates are to be effective with meter readings taken on and after Feb. 28. It is estimated that customers' bills will be reduced 10.3%.

The decision is the result of an investigation instituted by the commission in the fall of 1944. The company claimed $152.6 million as the average rate base for the year 1945, which includes working cash and a claimed allowance excess cost in according certain gas properties. For the same items of property the commission staff figured $147.5 million, with no allowance for excess cost or working cash. The commission concluded that a fair rate base for the average year of 1945 was $149 million. The company estimated 5.98% returns, and the commission staff 6.76% returns, before any rate reductions. Figures showed that a greater net revenue will be expected in 1946 than is apparent for figures shown in 1945.

Union Curbs Overtime for Southern California Gas Co.

Members of the CIO Utility Workers employed by Southern California Gas Co. will no longer be allowed to work overtime except in emergencies, according to a recent union announcement. The purpose of the order, according to L. R. Watterman of the union, is to force the company to hire more men and spread employment.

Pennsylvania Companies' Rate Increases Suspended

On Jan. 17 the FPC suspended rate increases filed by North Penn Gas Co. and its affiliate, Allegany Gas Co., both of Port Allegany, Pa., for the sale of natural gas at wholesale to customer companies in Pennsylvania and New York. The suspension was ordered because the rates would result in discrimination due to the wide variation in costs to the interstate wholesale customers. The companies claim the increases are necessary because the diminished local supply necessitates the transportation of natural gas from West Virginia and Texas. FPC ordered that the companies file equitable rate schedules by Feb. 1.

Revision of Gas-Oil Ratio Recommended for Okla. Field

Walker T. Pound, chief conservation officer of the Oklahoma Corporation Commission, recently filed an application for revision of the gas-oil ratio in the area of the West Edmond, Okla., field. Pound recommended that a limitation be fixed which would be the average ratio for the field plus 1200 cu. ft. This would increase the amount of gas produced with each barrel of oil, and Pound believes there would be less venting of gas in the field. W. J. Armstrong, a member of the commission, charged that about 10,000 Mcf of gas daily is being wasted in the area.

FPC Denies Rehearing on Mississippi Rate Reduction

The Federal Power Commission has denied a petition filed by Mississippi River Fuel Corp. for rehearing on the Commission's order of Nov. 9, 1945, directing the company to reduce its wholesale rates for natural gas sold in interstate commerce by not less than $945,613 a year or about 27%. The order states that no new facts have been presented which would justify revision of the Commission's previous opinion.

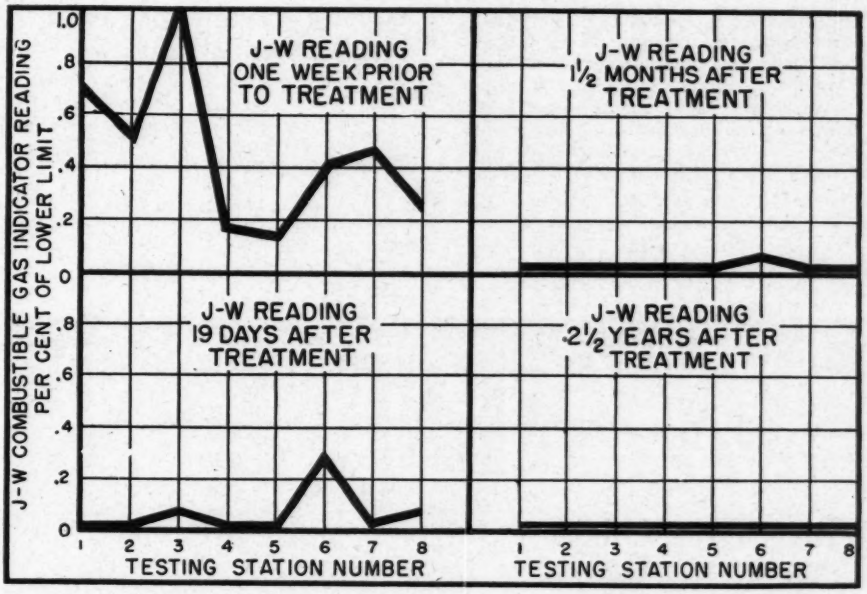
Publication Designed To Improve Employee Relations

The National Foreman's Institute, Inc., 527 Fifth Ave., New York 17, N. Y., is issuing a new fortnightly publication, **The Industrial Newsletter.** It will contain material of direct concern to employees — general news that affects workers' interests, current events and their importance to all who earn a living, and various articles on health, promotion, personal advancement, etc. Copies are available from 6¢ to 20¢ each, depending on quantity.

Rockwell International Corp. To Handle Export Activities

To coordinate the export activities of subsidiaries and divisions of Rockwell Manufacturing Co., Rockwell International Corp., with offices in the Empire State Building, has been organized. Under the direction of A. L. Di Giulian, the new corporation will conduct export sales and establish export sales policies for a number of Rockwell Manufacturing subsidiaries and for several independent companies.

Actual Tests of Gas Leakage Show the Value of *Carboseal Anti-Leak*


J-W COMBUSTIBLE GAS INDICATOR READING PER CENT OF LOWER LIMIT
1.0
.8
.6
.4
.2
0
J-W READING ONE WEEK PRIOR TO TREATMENT
J-W READING 1½ MONTHS AFTER TREATMENT
J-W READING 19 DAYS AFTER TREATMENT
J-W READING 2½ YEARS AFTER TREATMENT
1 2 3 4 5 6 7 8
TESTING STATION NUMBER
1 2 3 4 5 6 7 8
TESTING STATION NUMBER

Notice how the graph shows that leakage from bell and spigot joints was materially decreased within nineteen days after treatment with Carboseal Anti-Leak. In one and one-half months leakage was almost completely stopped, and joints were still tight two and one-half years after treatment.

To learn more about how this effective low-cost treatment can be used in your gas distribution system write for the booklet, "Correcting Leakage in Gas Distribution Systems with Carboseal Anti-Leak." It will tell you how Carboseal Anti-Leak is applied, how much it costs, and what results can be obtained.

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

"Carboseal" is a registered trade-mark of Carbide and Carbon Chemicals Corporation

CARBOSEAL *Anti-leak*

E. HOLLEY POE & ASSOCIATES

SEVENTY PINE STREET

NEW YORK 5, N. Y.

NATURAL GAS CONSULTANTS

Colorado-Wyoming Rate Schedule Accepted by FPC

The Federal Power Commission recently accepted new rate schedules filed by Colorado-Wyoming Gas Co. which reduce its gas rates by $284,224 a year based on 1944 volume of sale, and accepted schedules filed by Canadian River Gas Co. cutting its rates to the Clayton Gas Co., Clayton, N. Mex., by $11,803 annually on the basis of 1944 sales. In accordance with an FPC order of March 18, 1942, Colorado-Wyoming's new rates are to be made effective on all bills rendered on and after June 15, 1942, and Canadian River's will be effective from May 20, 1942.

As a result, Colorado-Wyoming will be required to refund to customers in Colorado and Wyoming $885,000 representing the difference between the reduced rates and the rates the company has charged from June 1942 to December 1945. Canadian River Co. will refund approximately $40,000 representing excessive charges collected from the Clayton Co. during the three-year period in which it unsuccessfully contested the FPC rate reduction order in the courts.

Oklahoma Royalty Owner Group Joins INGAA

Directors of the Texas County Land and Royalty Owners Association voted last month to affiliate its membership with the Independent Natural Gas Association of America. The Texas County organization, composed of persons owning lands and royalty in Texas County, Okla., will retain its identity and continue its operations.

WARREN
LIQUEFIED PETROLEUM GAS

TO THE MANAGEMENT OF SMALL CITY GAS DISTRIBUTION SYSTEMS

Warren's Liquefied Petroleum Gas is growing as a source of dependable service and more profitable operation for small city gas distribution systems. With comparatively low expense for plant conversion, the labor, fuel and maintenance costs are substantially less with the adoption of Liquefied Petroleum Gas. Regardless of the load, the Liquefied Petroleum Gas plant operates automatically and assures steady and adequate supply of uniform quality.

Plan now for early conversion of that small city gas plant to Warren's Liquefied Petroleum Gas. The broad experience, engineering advice and consulting service of Warren's trained organization are available to utility management without obligation. Warren's production, storage and transportation facilities are adequate to meet your requirements.

WARREN PETROLEUM CORPORATION
TULSA, OKLAHOMA
Detroit, Michigan Houston, Texas

Flared Gas in Texas Said to Lack Useful Outlet

A report released by Beauford Jester, Texas railroad commissioner, and compiled by an industry survey committee, disclosed that in 177 Texas fields during the past year casinghead gas production reached 2486 MMcf per day. 57% of it flared for lack of a useful outlet. The analysis showed that flaring is greatest on the Gulf coast and in West Texas. Gulf coast fields were found to produce 569 MMcf of casinghead gas daily and to flare 370 MMcf.

The report pointed out that gas-oil ratios in some fields were excessive and recommended a "more realistic control" of gas-oil ratios which would reduce the flaring of gas by some 300 MMcf daily. It also recommended an eight-point long term conservation program. The chairman of the Commission issued a warning to operators that if they did not voluntarily cooperate, the Commission would call hearings and issue necessary orders.

Coroaire Heater Corp. Awards Hero First Model

Coroaire Heater Corp. of Cleveland presented the first Coraire home heater off the assembly line to Sgt. and Mrs. Forrest Everhart of Bainbridge, Ohio. Sgt. Everhart was the first Ohioan to win the Congressional Medal of Honor in this war.

The Coroaire heater, designed to furnish unit heat for homes, stores, offices and factories, is made in the Berger Division of Republic Steel Corp., Canton, Ohio. Fuel for this unit is gas, with electricity used for blowing action.

IOCC Issues Educational Book on Conservation

As a part of its nationwide educational program on the conservation of oil and gas, the Interstate Oil Compact Commission has issued from its headquarters at Oklahoma City an illustrated booklet entitled, "Oil in Your Future".

Language of the publication is simple, eliminates technicalities and the illustrations make the text easily understandable to the layman.

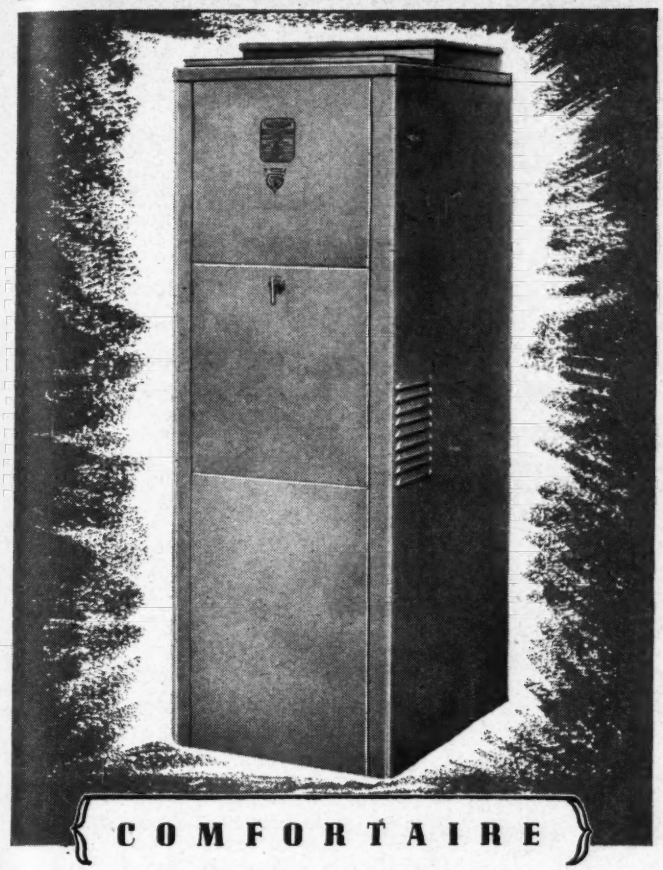
Stacey Brothers Expand; Offer Technical Service

Stacey Brothers Gas Construction Co., Cincinnati, one of the Dresser Industries, is completing a large expansion program involving the entire organization and shop facilities in order to give a specialized technical service to the gas industry, with emphasis on the design and construction of propane and butane-air installations and liquefied natural gas storage plants, according to William E. Gruening, president.

Arkansas-Western To Spend $58,000 for New Lines

The Arkansas-Western Gas Co., Fayetteville, Ark., has received permission from the Arkansas Public Service Commission to serve the town of Mulberry with natural gas. Construction cost of proposed distribution lines is $58,000.

Another Member of the Hammel Line



COMFORTAIRE

The Comfortaire is but one of the Hammel family of dependable gas heating and ventilating units. Included in the Hammel line are Gravity Furnaces, Floor Models, Vented Wall Heaters, Dual Wall Heaters, Consolaires and others designed for every need.

Quiet, compact and completely automatic Hammel *Comfortaire* heating and ventilating units assure clean, filtered air to all rooms.

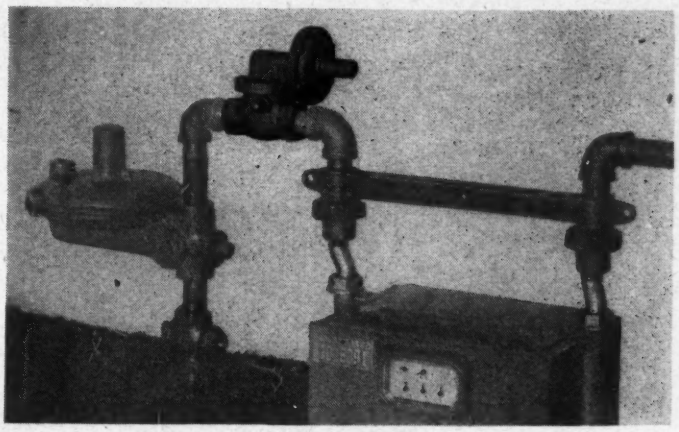
No basement is required for installation, in fact, so little room is needed that a Comfortaire may easily be installed in a closet, hall or wall recess.

Automatic heating and ventilating is both dependable and economical with a Comfortaire made by Hammel.

Write today for complete information on the Comfortaire or any unit in the Hammel line.

Hammel
RADIATOR ENGINEERING CO.
A. S. Martinson & Associates
Successors to Hammel Radiator Corp.
SINCE 1912
3348 Motor Ave. Los Angeles 34

SENTRY
Automatic Low Pressure SHUT-OFF VALVE



Saves Man Hours and Fire Damage Claims

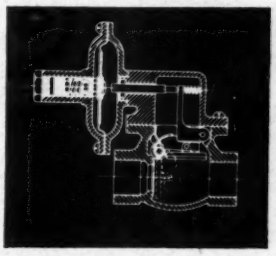
The Sentry Low Pressure Shut-Off Valve is installed between the meter and the house gas lines.

Set to any predetermined pressure it instantly and positively shuts off service when pressure in the main falls below the setting selected. Gas stays off without leakage until the valve is manually reset.

All fire hazards due to leakage from pilots and appliance jets, flames of which have gone out from decreased or interrupted pressure are eliminated.

No longer is it necessary to close a district in case of partial outage as the Sentry Valve permits pressure to be raised safely.

In case of complete outage all services are automatically closed eliminating the time and expense of doing this manually. After line service has been restored only one trip is necessary to reset valve and service appliances.



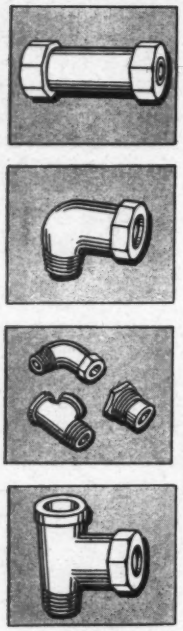
The Sentry Valve was developed in close cooperation with leading gas authorities.

Engineering data and results of exhaustive dependability tests will be sent on request.

SECURITY VALVE CO.
A Division of Hayward Industries
410 San Fernando Road, Los Angeles 31, California

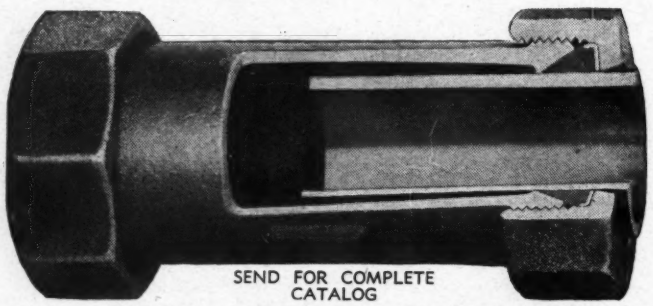
NORMAC COUPLINGS
SLEEVES AND FITTINGS

for maximum deflection, ease of "stabbing," complete confinement of the rubber!



So close are "Normac" rubbers confined at the gasket tip that possibility of flow is reduced almost to "nil." These couplings, sleeves and fittings . . . approved by gas utility men across the country for their time-saving features, ease of handling and dependable service . . . are available in a complete range of sizes. Made from air furnace malleable iron they provide greater wall thickness than pipe on which used.

NORTON-McMURRAY
MANUFACTURING COMPANY
39 South La Salle St. Chicago, Ill.



SEND FOR COMPLETE CATALOG

Couplings - Meter Bars - Sleeves - Cocks - Bell Joint Clamps - Service Tees & Ells

HAVE A LOOK—"through the OPERATOR'S EYE"

New hi-powered models bore 2½ to 14½ inch hole—FAST!

Write for Engineering Data and Illustrated Booklet

A LOOK through the HYDRAUGER Sights tells you precisely where your pipe-run will emerge 150-200 feet away! The HYDRAUGER then bores and reams the hole, just over pipe-size, right to the TARGET. The HYDRAUGER method is quick, sure, and least costly. With a HYDRAUGER, traffic interference is reduced and unnecessary pavement cutting and ditching is avoided. No loss of pipe-strings like in ramming or jacking. Drills conglomerates and semi-hard formations. Operates on 90-pounds air-pressure, and uses sufficient water to flush back cuttings from the bit.

HYDRAUGER
HYDRAUGER CORPORATION, LTD.
116 NEW MONTGOMERY STREET
SAN FRANCISCO, CALIFORNIA

National Radiator Co. Expands New Castle Plant

The National Radiator Co., Johnstown, Pa., has started construction of an extensive addition to its plant at New Castle, Pa., it was announced recently by Robert S. Waters, president. The new plant will cost more than $235,000 including equipment. Facilities for another mechanical moulding unit that will substantially increase production of castings for industrial use and for heating systems will be provided in the new building.

E. L. Brundage, superintendent of the New Castle plant, states that jobs for an additional 200 employees will be made available by the expansion. Production is expected to begin by March 1.

Reprints of Gas Kitchen Pamphlet Now Available

"Open the Door to a New World of Ease and Convenience", the eight-page pamphlet prepared by the Committee on National Advertising of the American Gas Association, features four of the most popular designs of New Freedom Gas Kitchens and has complete selling copy on gas cooking, automatic heating, air conditioning and refrigeration. Quantity lots are available from Committee on National Advertising, American Gas Association, 420 Lexington Avenue, New York City, at 5c per copy.

El Paso Natural Sponsors Foremanship Course

The El Paso (Texas) Natural Gas Co. sponsored a foremanship course for superintendents and foremen at its Jal, New Mexico, division. The class, called "Basics of Supervision", met two hours nightly for two weeks under the instruction of J. M. Stricklin. The course emphasized that the foreman is the middle man in an industrial organization with definite responsibilities and obligations to the employees as well as to the management. Two examinations were given during the course.

H. A. Smith Machine Co. Now Rockwell Machine Co.

The H. A. Smith Machine Co., Hopewell, N. J., has been renamed Rockwell Machine Co. The company, a subsidiary of Rockwell Manufacturing Co., builds meter registers, regulators and gauge cocks and supplies precision machined parts to other subsidiaries and divisions of Rockwell Manufacturing. The change in name is accompanied with no personnel or policy changes. Herbert S. Rockwell continues as director of operations at the Hopewell plant.

Guffey Resolution Approved

Congressional study of mineral resources, including natural gas, appeared assured when the Senate approved the Guffey Resolution (S. Con. Res. 22) under which Secretary Ickes will submit to Congress data on the mineral situation. These data will be used in planning a program of surveys to safeguard the nation's future by supplying information to assist industry and government in continuing exploration, conservation and development.